

NAS CAPABILITIES

D.1 NAS Capabilities Diagrams

1. Increased Navigation/Landing Position Accuracy and Site Availability, Air Traffic Services, Arrival/Departure

Figures D-1 and -2 show Phases 1 and 2, respectively, of this capability.

Phase 1 (1998–2002)

- Improved position accuracy is obtained by using range and time data from the Global Positioning System (GPS) as well as GPS correction and integrity information (Wide Area Augmentation System (WAAS)). GPS correction and integrity information from ground systems (WAAS) is relayed through satellites to ensure the signal in space will provide coverage for aircraft at various altitudes. The aircraft's location is displayed to pilots. GPS equipment and GPS augmentation enhance aircraft area navigation (radionavigation) capability for point-to-point flight routes.
- Improved precision approach capability using satellite-based navigation instrument ap-

proaches allows precision approaches to category (CAT) I minima at more airports. Satellite-based navigation instrument approaches allow multiple approach paths to many runways. The existing instrument landing systems remain in place during this period.

- Runway and approach lighting systems continue to provide the visual transition from cockpit instrumentation to visual landing during touchdown and rollout. Airport lighting remains a key element to sustaining flight operations during reduced visibility conditions.
- Provides WAAS precision approaches to airports that currently have existing CAT I or other approaches. Actual approach minima will continue to be based on obstacle clearance, lighting, etc.
- Provides WAAS precision approaches to airports that currently do not have precision approaches. Actual approach minima will continue to be based on obstacle clearance, lighting, etc.

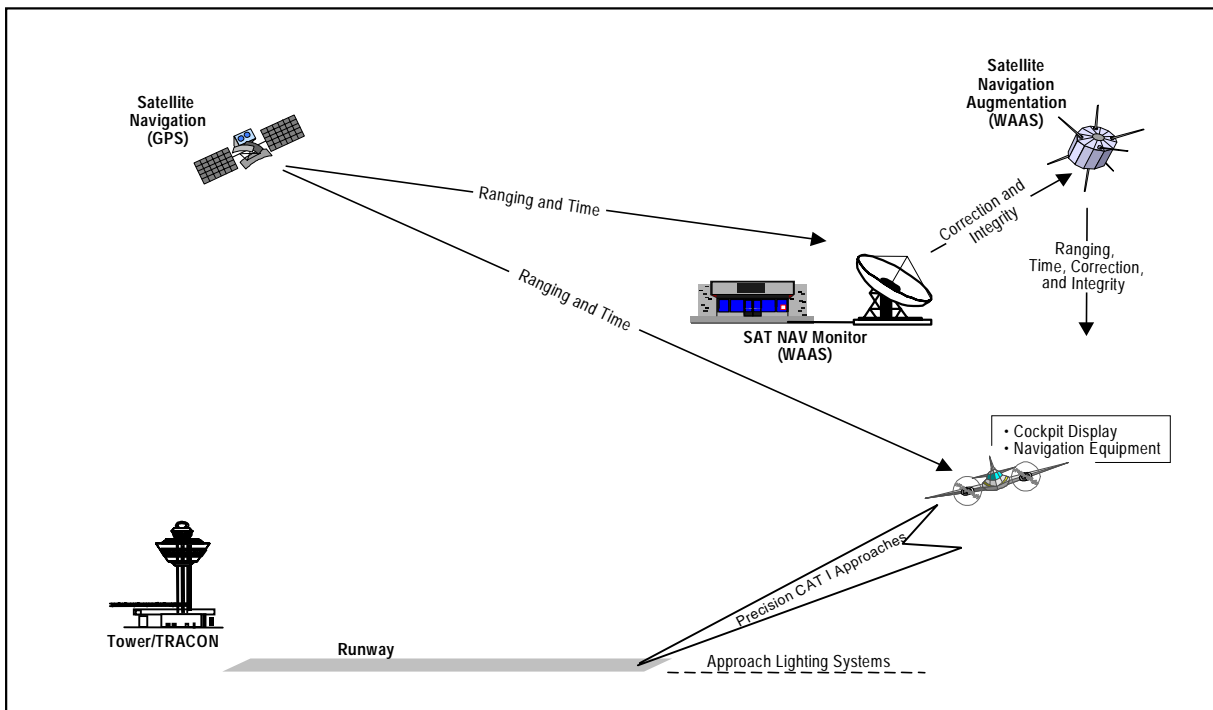


Figure D-1. Increased Navigation/Landing Position Accuracy and Site Availability, Air Traffic Services, Arrival/Departure, Phase 1 (1998–2002)

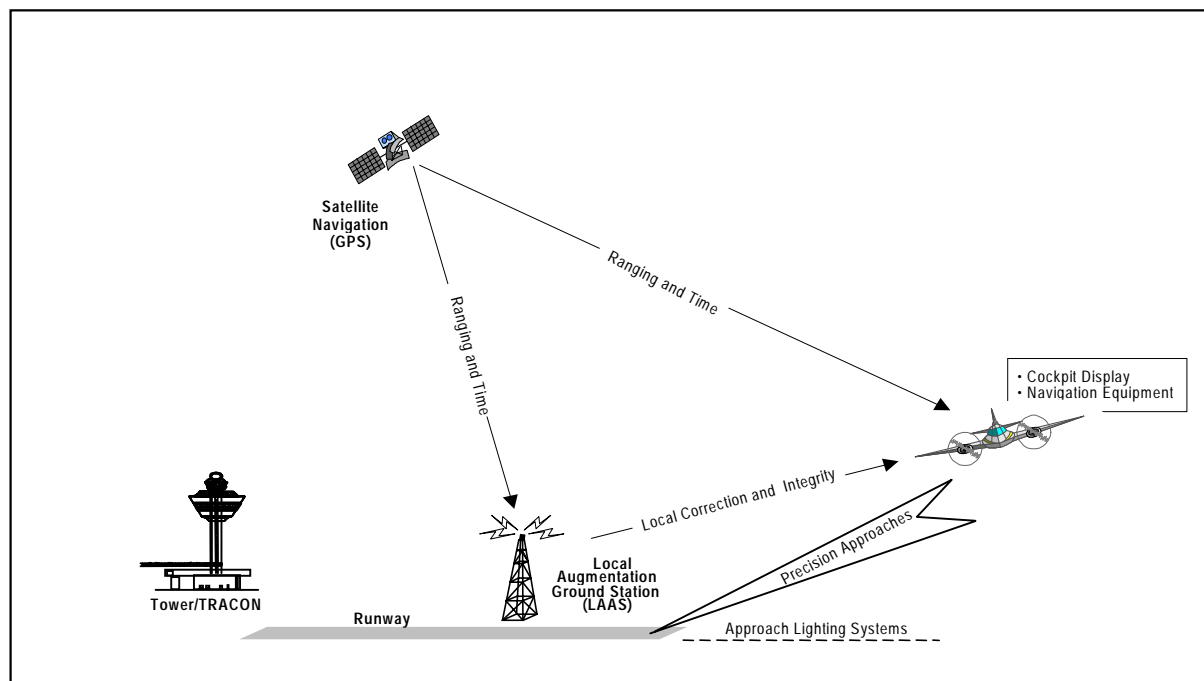


Figure D-2. Increased Navigation/Landing Position Accuracy and Site Availability, Air Traffic Services, Arrival/Departure, Phase 2 (2003–2007)

- Site availability is improved due to the increase in CAT I approaches available at potential alternate landing sites.

Phase 2 (2003–2007)

- Satellite-based navigation will be locally augmented to provide increased precision guidance accuracy, integrity, and availability.
- Local GPS augmentation allows for CAT II/III precision approach capability and for increased availability of CAT I approaches.

Phase 3 (2008–2015)

- No additional change in capability.

1. Increased Navigation/Landing Position Accuracy and Site Availability, Air Traffic Services, Oceanic

Figure D-3 shows Phase 1 of this capability.

Phase 1 (1998–2002)

- Improved position accuracy is obtained by using range and time data from GPS. The location will be displayed for the pilot.
- Inertial guidance systems and satellite-based navigation equipment are available to support area navigation operations aboard properly

equipped aircraft. This provides a more precise and reliable means of navigation during long flights over water.

Phase 2 (2003–2007)

- No additional changes in capability.

Phase 3 (2008–2015)

- Same functionality as En Route/Cruise.

1. Increased Navigation/Landing Position Accuracy and Site Availability, Air Traffic Services, NAS-Wide

Figure D-4 shows Phase 1 of this capability.

Phase 1 (1998–2002)

- Improved position accuracy is obtained by using range and time data from GPS, and GPS correction and integrity information from WAAS. GPS correction and integrity information from ground systems (WAAS) is relayed through satellites to ensure the signal in space will provide coverage for aircraft at various altitudes. The aircraft's location is displayed to pilots. GPS equipment and GPS augmentation provide vertical reference and enhance aircraft area navigation (RNAV) capability for point-to-point flight routing.

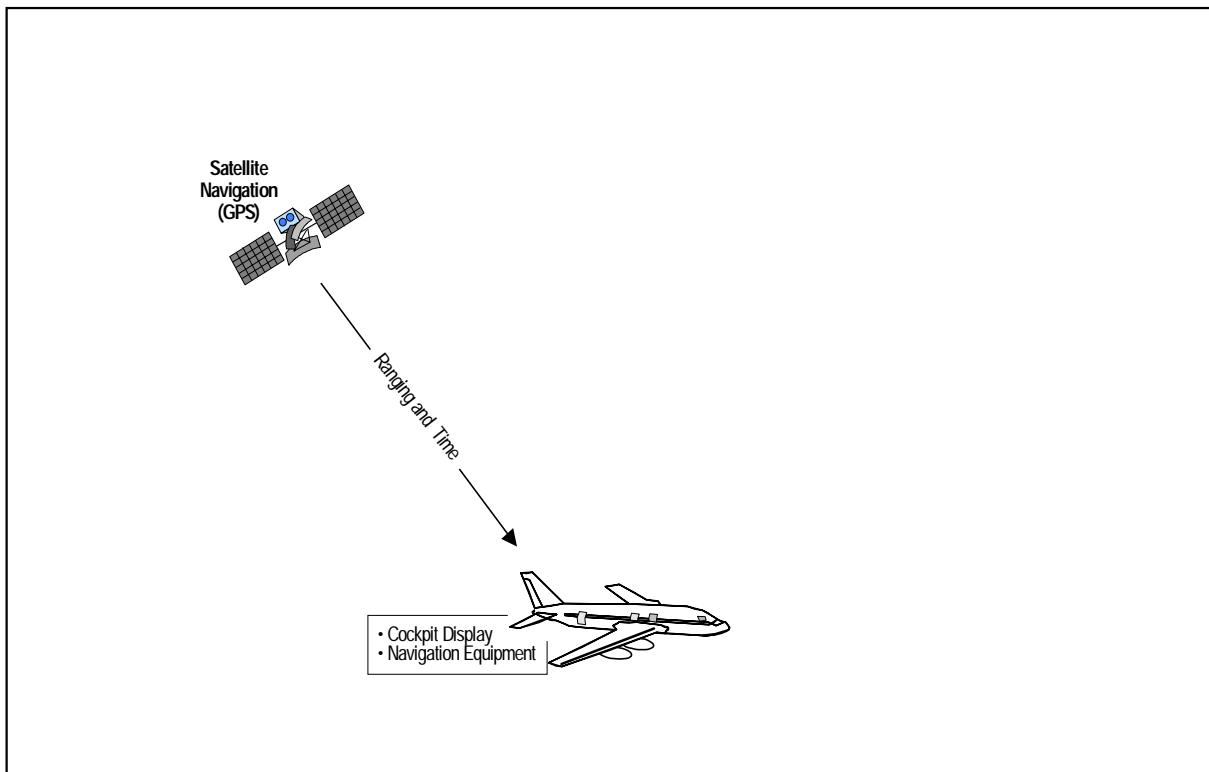


Figure D-3. Increased Navigation/Landing Position Accuracy and Site Availability, Air Traffic Services, Oceanic, Phase 1 (1998–2002)

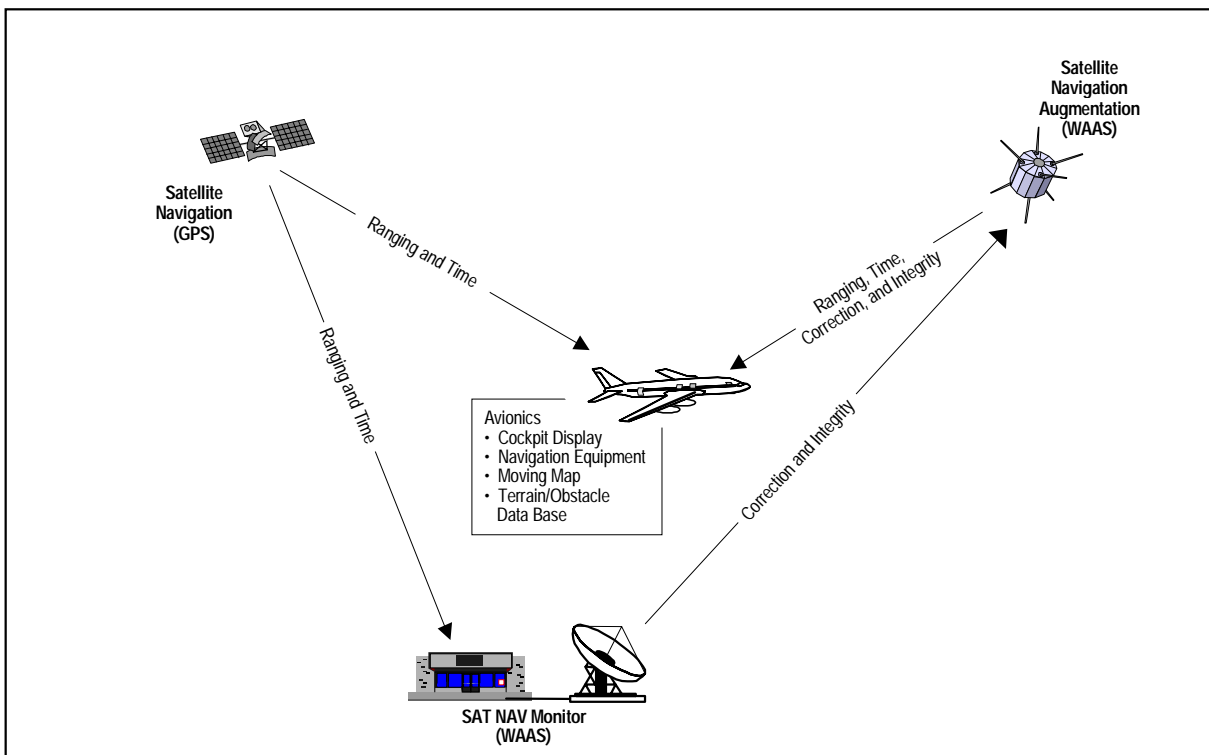


Figure D-4. Increased Navigation/Landing Position Accuracy and Site Availability, Air Traffic Services, NAS-Wide, Phase 1 (1998–2002)

- Avionics enhancements could include moving terrain map and position display on the cockpit displays.
- An enhanced terrain awareness warning system (TAWS) provides pilots with more ground proximity warning time.

Phase 2 (2003–2007)

- No additional change in capability.

Phase 3 (2008–2015)

- No additional change in capability.

2. Increased Exchange of Common Weather Data, Air Traffic Services, Arrival/Departure

Figures D-5, -6, and -7 show Phases 1, 2, and 3, respectively, of this capability.

Phase 1 (1998–2002)

- In-flight graphical terminal weather information (TWIP) is provided to pilots based on weather radar data (TDWR, ASR-9 WSP) relayed through a service provider. This service is primarily for commercial carriers.

- Local weather radar, sensor information, and National Weather Service (NWS) weather products are integrated for improved distribution.
- The integrated weather products are distributed to other facilities (i.e., terminal radar control facility (TRACON), automated flight service station (AFSS), air route traffic control center (ARTCC), Department of Defense (DOD)) for rapid dissemination to all users who need the information. Ground weather observation data are broadcast directly to the aircraft operating in the local area.
- Weather information, including pilot reports (PIREPs), is transmitted to the cockpit via existing very high and ultra high frequency (VHF/UHF) radios. This will continue to meet the needs of aircraft not equipped to receive digital weather data.

Phase 2 (2003–2007)

- Integrated weather data are displayed on the service provider's workstation.

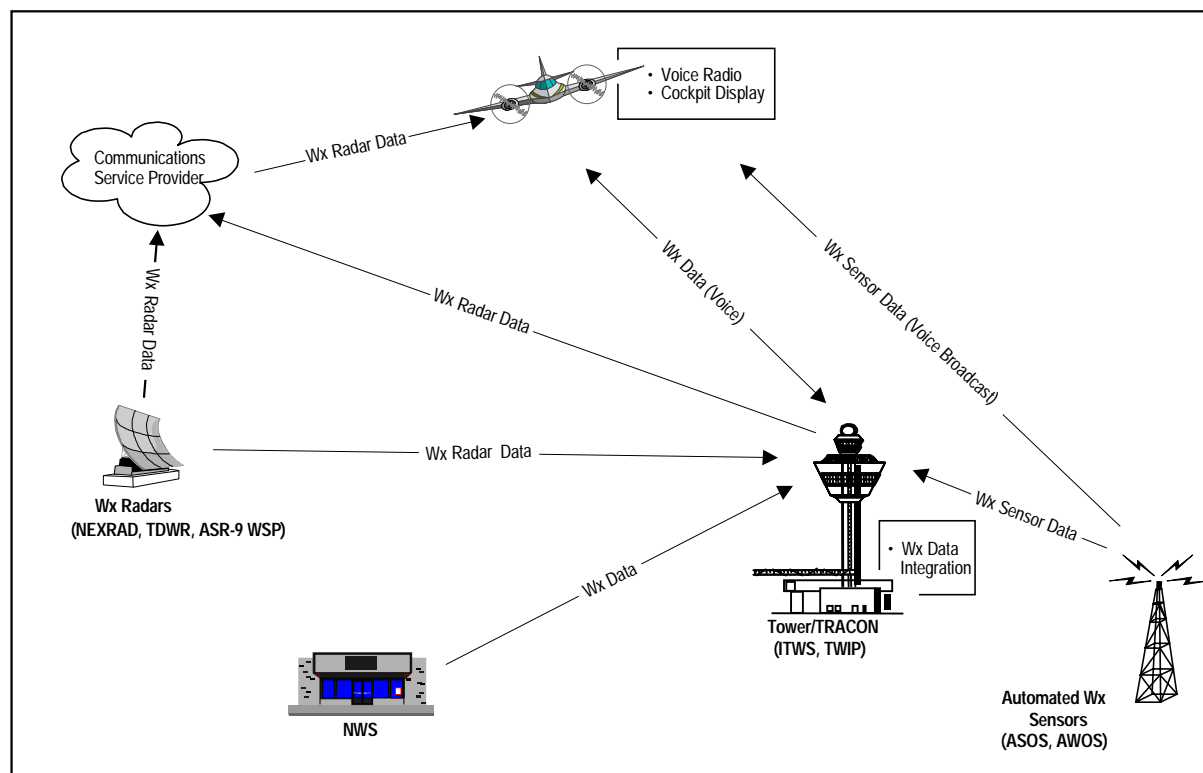


Figure D-5. Increased Exchange of Common Weather Data, Air Traffic Services, Arrival/Departure, Phase 1 (1998–2002)

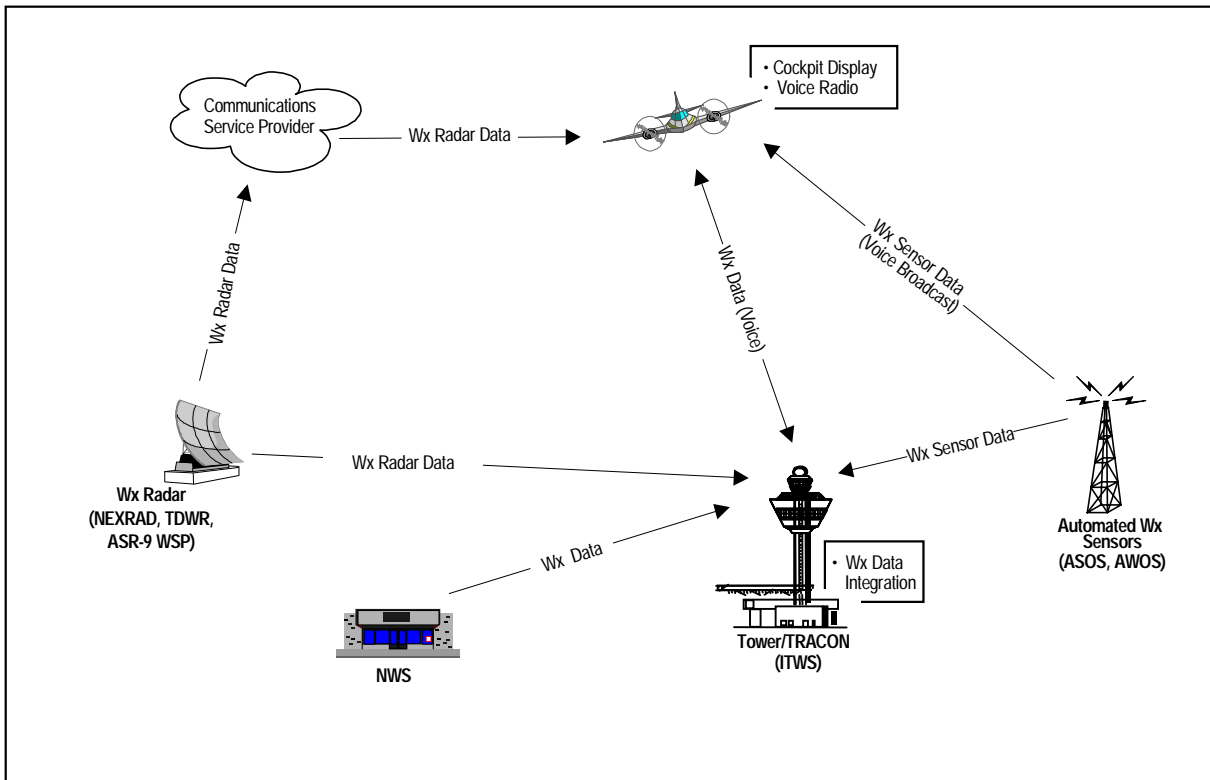


Figure D-6. Increased Exchange of Common Weather Data, Air Traffic Services, Arrival/Departure, Phase 2 (2003–2007)

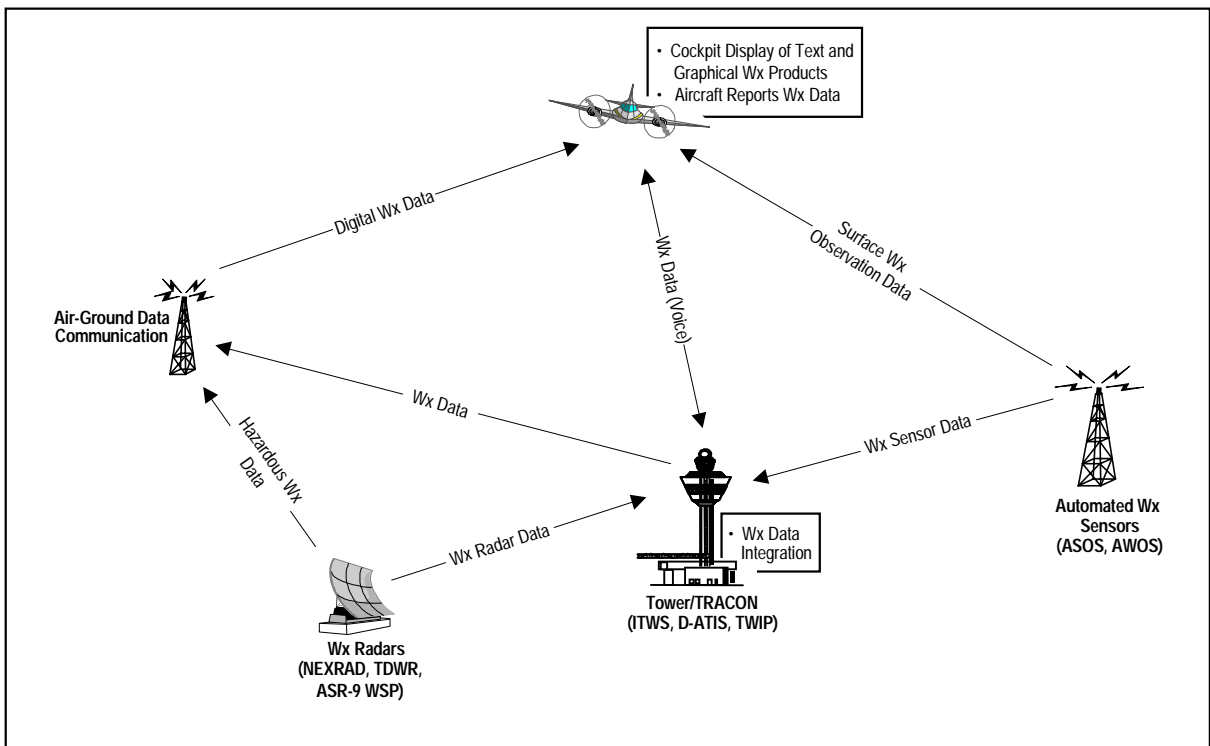


Figure D-7. Increased Exchange of Common Weather Data, Air Traffic Services, Arrival/Departure, Phase 3 (2008–2015)

- Service provider workload is reduced as the weather and air traffic information is presented on a common display.
- Terminal weather systems will continue to produce new and improved weather products.

Phase 3 (2008–2015)

- Provides real-time windshear alert information to pilots and service providers automatically and simultaneously.

2. Increased Exchange of Common Weather Data, Air Traffic Services, En Route/Cruise

Figure D-8 shows Phase 1 of this capability.

Phase 1 (1998–2002)

- Weather information is available in the cockpit to users at all levels of avionics/communications equipment based on improved availability/access to center (ARTCC) and flight service station (FSS/AFSS) service providers. Data from multiple weather sensing sources are integrated at the ARTCC and displayed on en route service providers' workstations. In the ARTCC, traffic management specialists see terminal weather information, and the

ARTCCs distribute integrated weather products to AFSSs and the NWS.

- Terminal weather information is exchanged within the ARTCCs to provide a common weather data picture among terminal and en route service providers.

- Users continue to observe and disseminate weather information. Pilots continue to provide information to the ARTCC or AFSS about in-flight conditions in pilot voice reports (PIREPS).

- Weather information exchange between pilots and service providers continues via existing radios.

Phase 2 (2003–2007)

- No additional change in capability.

Phase 3 (2008–2015)

- No additional change in capability.

2. Increased Exchange of Common Weather Data, Air Traffic Services, NAS-Wide

Figure D-9 shows Phase 1 of this capability.

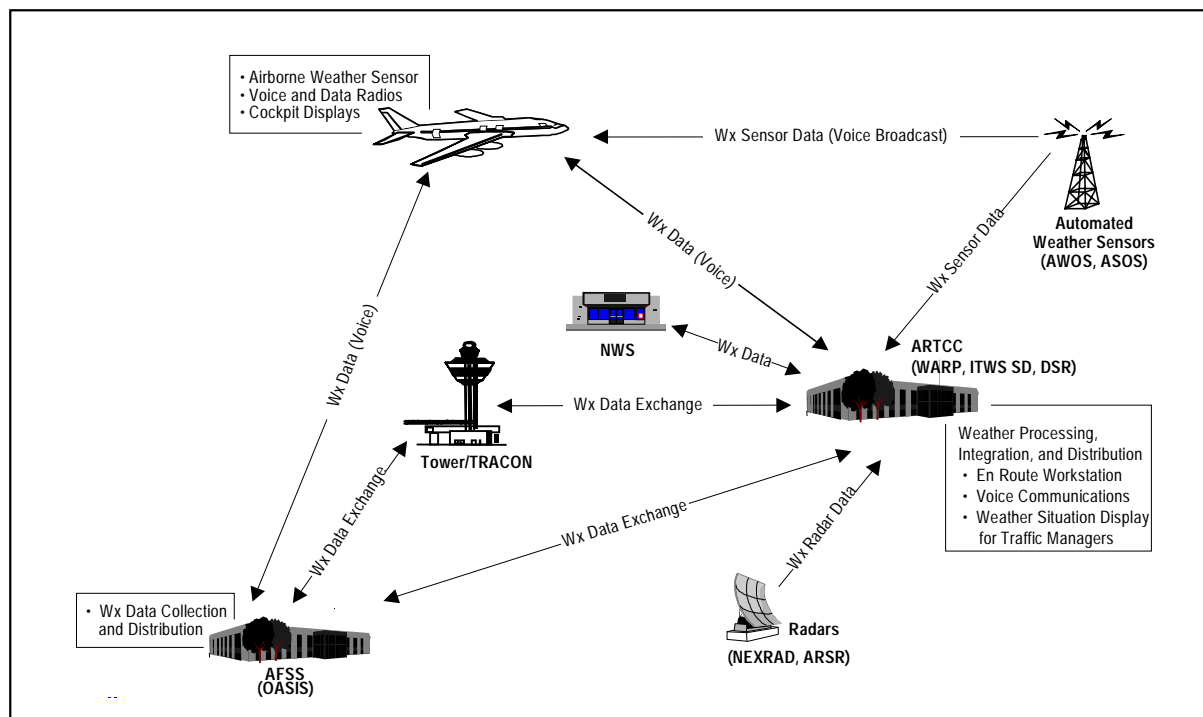


Figure D-8. Increased Exchange of Common Weather Data, Air Traffic Services, En Route/Cruise, Phase 1 (1998–2002)

Phase 1 (1998–2002)

- Some commercial aircraft act as weather sensors, providing real-time wind, temperature, and humidity data for improved weather forecasting and traffic planning.
- A collection of in-flight weather data is transmitted to the NWS from properly equipped aircraft. The NWS processes the information at its modeling centers, constantly updating computer models with new data to provide improved hourly forecasts of aviation-impacting weather.
- Private vendors provide weather data as part of the flight information service (FIS). Some air crews have access to both textual weather updates and graphical weather displays.

Phase 2 (2003–2007)

- No additional change in capability.

Phase 3 (2008–2015)

- No additional change in capability.

3. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, Tower/Airport Surface

Figures D-10, -11, and -12 show Phases 1, 2, and 3, respectively, of this capability.

Phase 1 (1998–2002)

- At the busiest airports, the airport surface detection equipment (ASDE) provides controllers with primary radar targets to display the position of aircraft and vehicles operating on airport taxiways and runways. ASDE with the airport movement area safety system (AMASS) provides target information and alerts controllers to potential collision situations in the airport movement area.
- Safety is increased by providing conflict detection alerts and improving controllers' situational awareness, particularly in low-visibility conditions.

Phase 2 (2003–2007)

- At airports that do not have ASDE/AMASS, but are large enough to qualify for the runway incursion reduction program, primary radar data will be provided to controllers to help avoid runway incursions.
- Airport markings, signage, and lighting will be improved. Also, improvements will be made in the training for pilots about runway markings, signage, and lights.

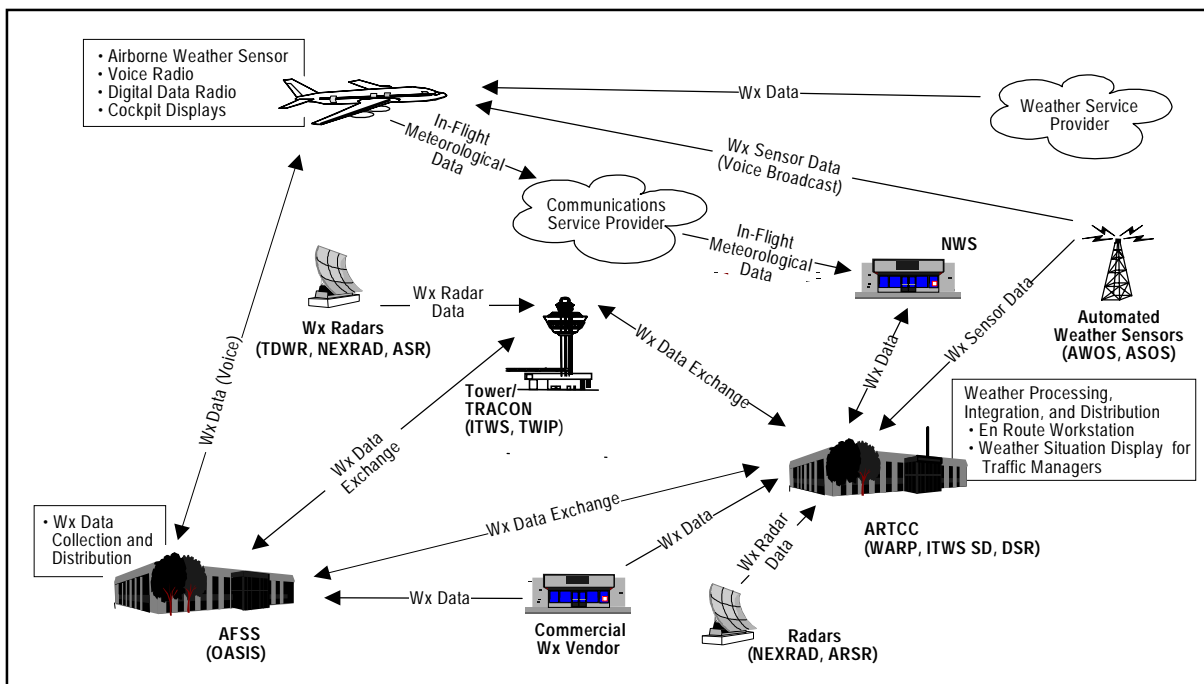


Figure D-9. Increased Exchange of Common Weather Data, Air Traffic Services, NAS-Wide, Phase 1 (1998–2002)

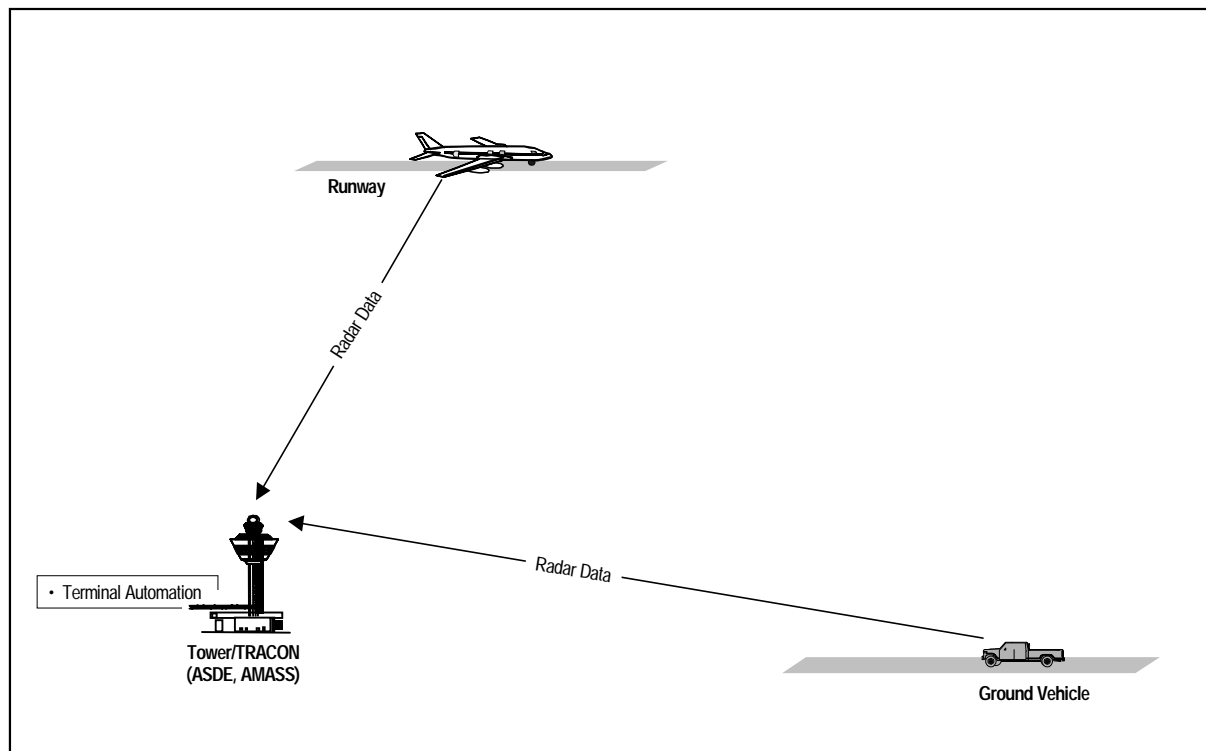


Figure D-10. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, Tower/Airport Surface, Phase 1 (1998–2002)

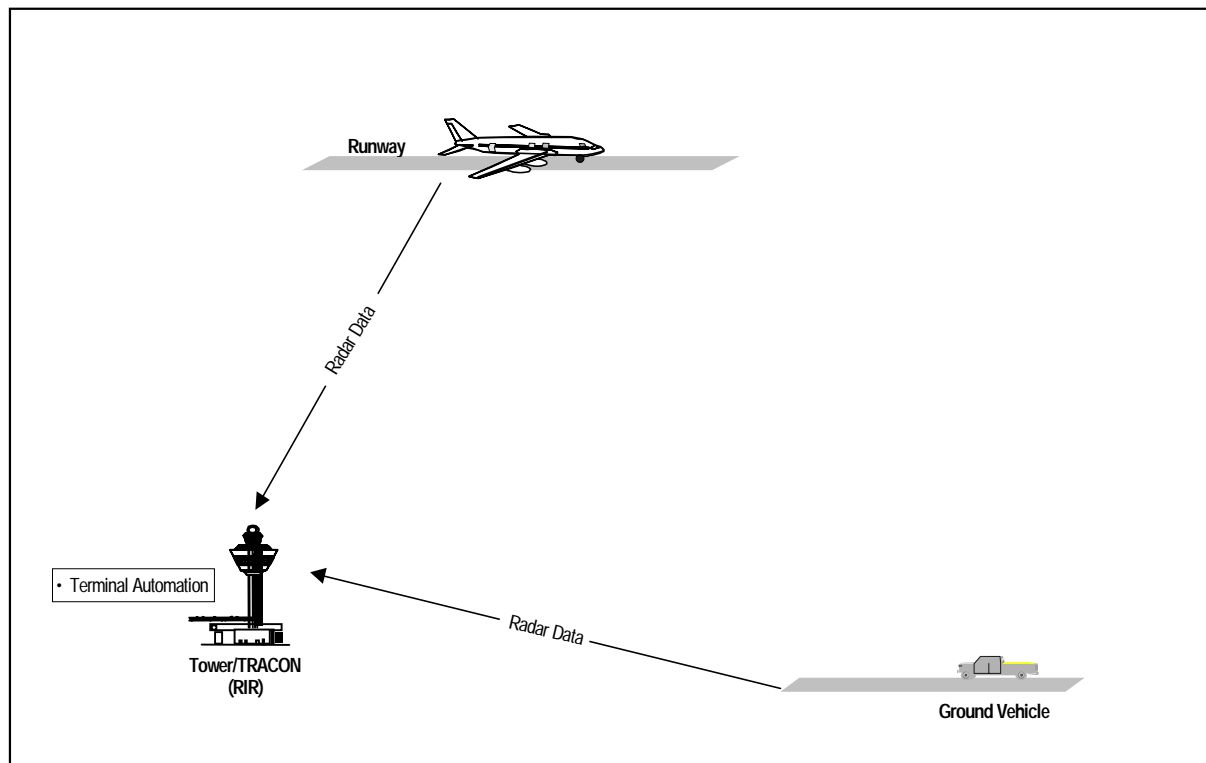


Figure D-11. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, Tower/Airport Surface, Phase 2 (2003–2007)

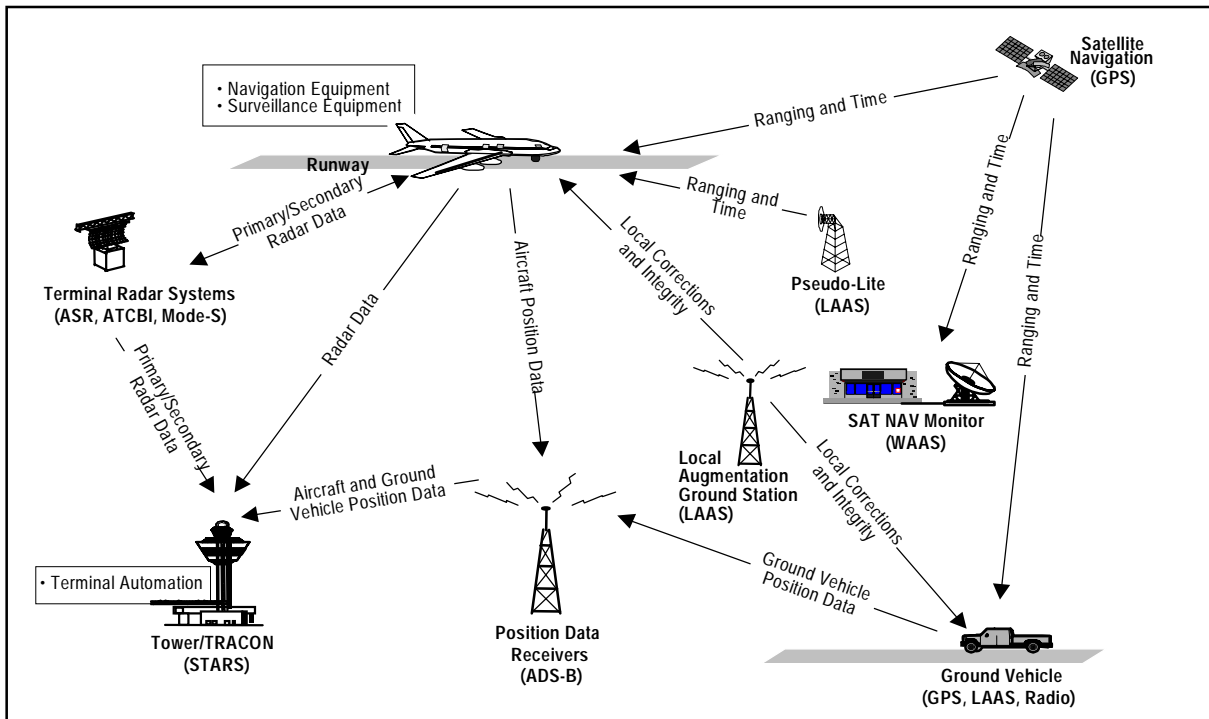


Figure D-12. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, Tower/Airport Surface, Phase 3 (2008–2015)

- Airport surveillance monitoring is more effective as surface surveillance accuracy is enhanced by the introduction of augmented GPS reports from aircraft and vehicular traffic.

Phase 3 (2008–2015)

- Integrated Tower Area Surveillance provides controllers better position information about the air traffic based on GPS. It also provides controllers integrated information about the arriving aircraft and airport surface aircraft.

3. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, Arrival/Departure

Figures D-13 and -14 show Phases 1 and 2, respectively, of this capability.

Phase 1 (1998–2002)

- Aircraft position accuracy reporting to service providers is improved.

Phase 2 (2003–2007)

- Terminal secondary surveillance radar (SSR) will be upgraded with the All Purpose Structured EUROCONTROL Radar Information

Exchange (ASTERIX) surveillance and weather message transfer protocol. This upgrade will allow the aircraft navigational system and waypoint data (i.e., ADS-B data) received in ground-initiated Comm B (GICB) replies to be processed. Selective interrogation (SI) capability allows the air traffic control (ATC) automation to use the unique Mode-S transponder identification code permanently assigned to an aircraft. SI also eliminates false data from the controller's display.

- Integrated terminal surveillance with ADS-B provides controllers better position information about air traffic based on GPS.

Phase 3 (2008–2015)

- No additional change in capability.

3. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, En Route/Cruise

Figure D-15 shows Phase 2 of this capability.

Phase 1 (1998–2002)

- No change in capability.

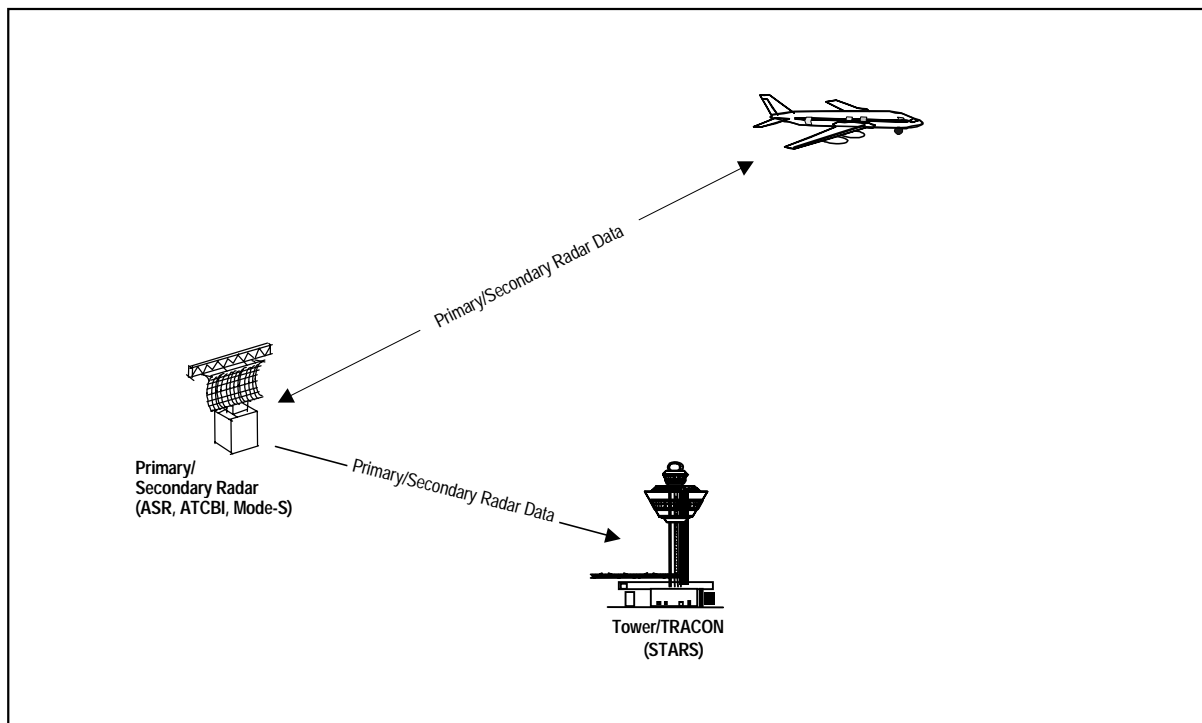


Figure D-13. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, Arrival/Departure, Phase 1 (1998–2002)

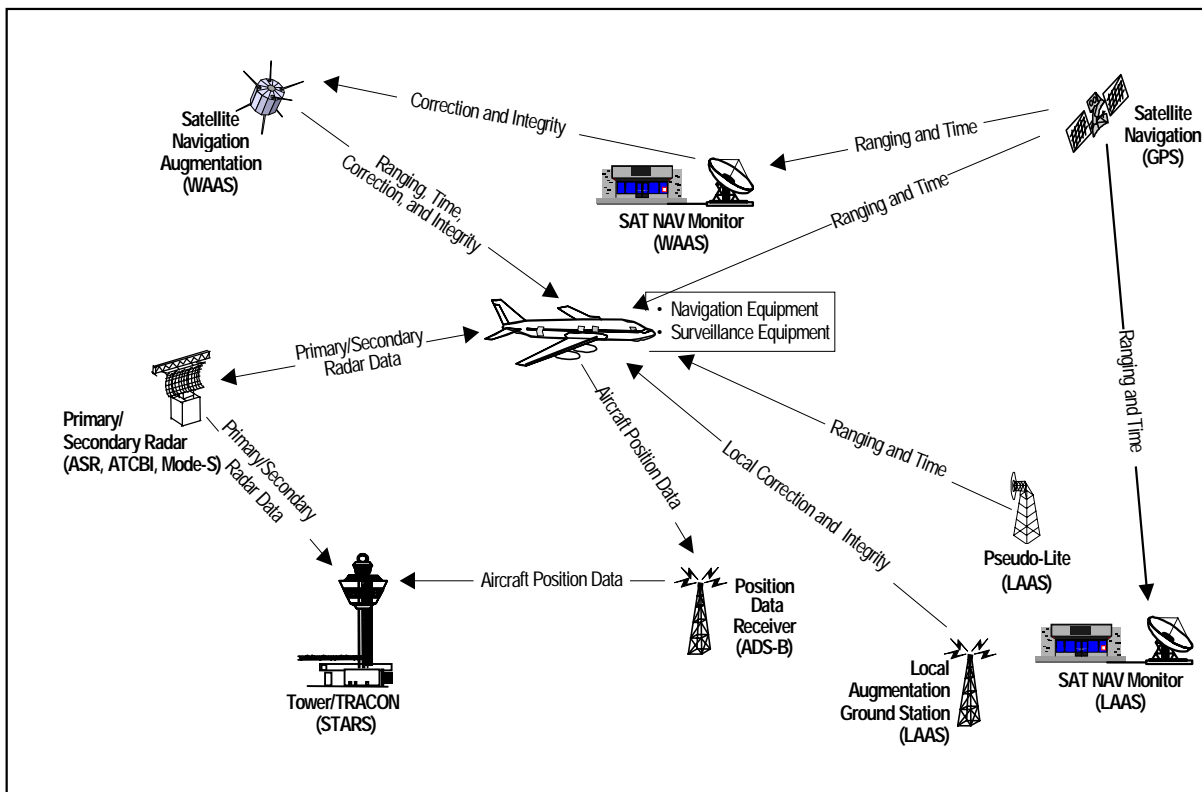


Figure D-14. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, Arrival/Departure, Phase 2 (2003–2007)

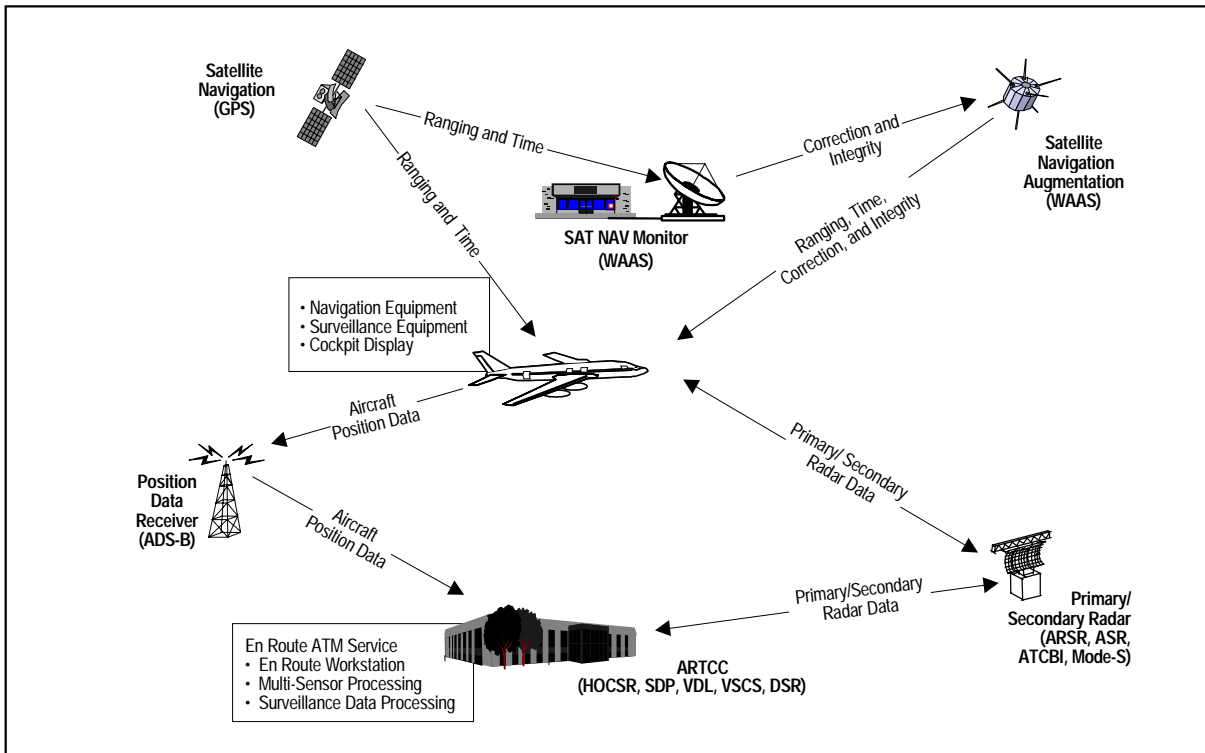


Figure D-15. Improved Aircraft Positional Accuracy Reporting to Service Providers, Air Traffic Services, En Route/Cruise, Phase 2 (2003–2007)

Phase 2 (2003–2007)

- Improved en route surveillance enhances aircraft position accuracy and intent information reporting to service providers. En route surveillance radar will be upgraded with the ASTERIX surveillance and weather message transfer protocol with SI capability. Integrating en route surveillance radar with automatic dependent surveillance broadcast (ADS-B) data provides controllers with better air traffic position information.
- More accurate flight monitoring is provided by widespread use of satellite navigation, improved radar, and the introduction of ADS-B ground processing.
- The position data processing includes combining targets from multiple types of sensors. Data sources include primary and secondary radar systems and ADS-B data.

Phase 3 (2008–2015)

- No additional change in capability.

4. Increased Self-Separation by Properly Equipped Aircraft, Air Traffic Services, NAS-Wide

Figure D-16 shows Phase 1 of this capability.

Phase 1 (1998–2002)

- More accurate position data allow more opportunities for self-separation by increasing flight crew's situational awareness. The satellite-based navigation system determines position from satellite signals and broadcasts the position information. Cockpit display of traffic information (CDTI) from ADS-B permits self-separation maneuvers, such as in-trail climbs. ADS-B provides pilots a cockpit display of traffic information of other ADS-B-equipped aircraft.
- The Mode-S transponder uses beacon-interrogation of nearby aircraft to determine their range, bearing, and altitude. The Traffic Alert And Collision Avoidance System (TCAS) then predicts possible conflicts and displays them to the pilot. Traffic conflict alert technologies currently aboard aircraft provide traffic alerts and resolution advisories to

flight crews. The resolution function provides advisories to climb or descend to avoid the traffic.

- In domestic airspace, pilots may use ADS-B air-air surveillance for situational awareness and limited shared responsibility for separation.
- In oceanic airspace, ADS-B may be approved as a means for pilots to conduct in-trail climbs, descents, and passing maneuvers.
- Aircraft separation is still performed on the ground. To resolve detected conflicts, pilots coordinate anticipated clearance deviations with ATC service providers before taking action.
- Traffic information service via Mode-S provides air traffic surveillance information to properly equipped in-flight aircraft using Mode-S.
- Air-air ADS-B and TCAS traffic information displays aid the pilot during in-trail climbs. Figure D-16 shows an example of self-sepa-

ration. The aircraft on the left intends to climb past the other aircraft.

Phase 2 (2003–2007)

- No additional change in capability.

Phase 3 (2008–2015)

- No additional change in capability.

5. Increased Surveillance Area Coverage, Air Traffic Services, En Route/Cruise

Figure D-17 shows Phase 2 of this capability.

Phase 1 (1998–2002)

- No change in capability.

Phase 2 (2003–2007)

- Controllers receive satellite-based position reports. Dependent surveillance ground stations extend the range of surveillance coverage.
- Enhanced en route radar coverage provides en route service providers with data from existing terminal secondary radars used to supplement the en route surveillance coverage.

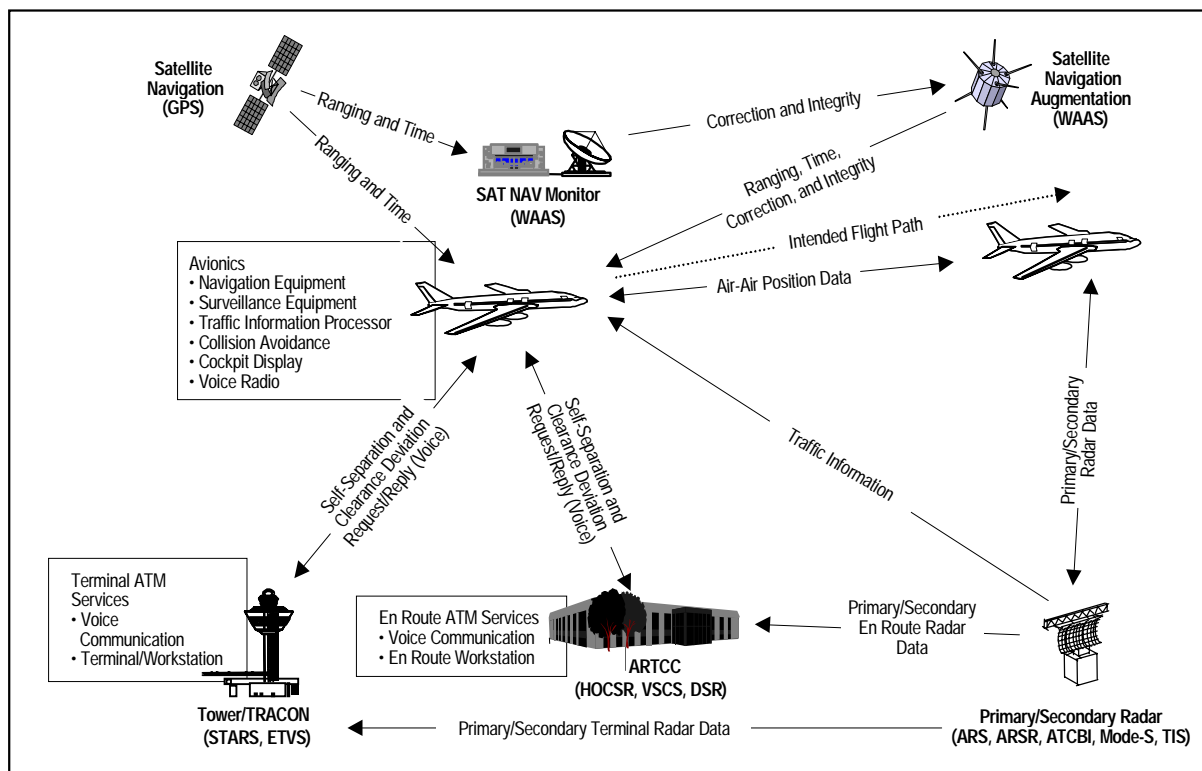


Figure D-16. Increased Self-Separation by Properly Equipped Aircraft, Air Traffic Services, NAS-Wide, Phase 1 (1998–2002)

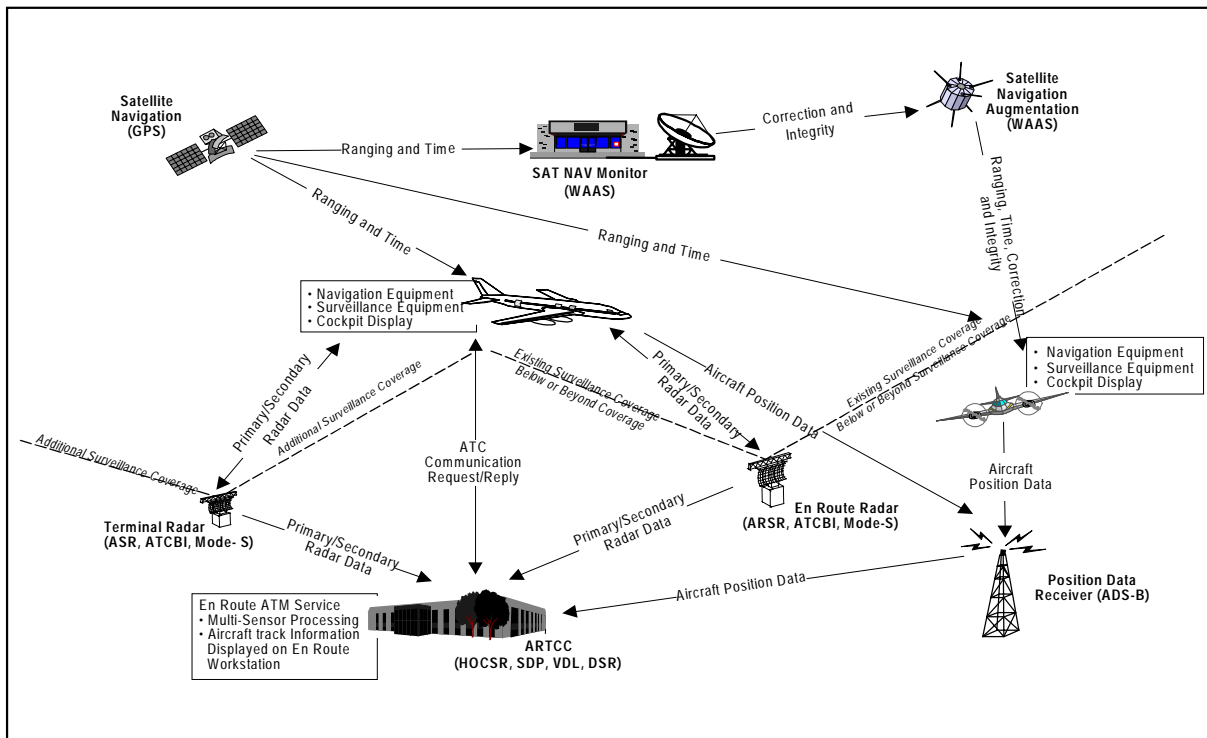


Figure D-17. Increased Surveillance Area Coverage, Air Traffic Services, En Route/Cruise, Phase 2 (2003–2007)

- ADS-B gap-filler provides en route service providers with expanded ability to offer separation services in remote areas not currently covered by radar by providing service providers the ability to receive aircraft position broadcasts.
- The en route automation system will be enhanced to fuse multisensor track data display into a single integrated target on the en route service provider's workstation.
- ADS will provide surveillance capability in oceanic airspace. ADS-A position reports received from aircraft in oceanic airspace are used to monitor aircraft trajectory from the ground. ADS-A provides position reports generated from the Future Air Navigation System (FANS)-1A- or aeronautical telecommunications network (ATN)-equipped aircraft via satellite communications (SATCOM), high frequency data link (HFDL), or other subnetworks. This gives controllers more timely and accurate position information about oceanic aircraft.

Phase 3 (2008–2015)

No additional change in capability.

5. Increased Surveillance Area Coverage, Air Traffic Services, Oceanic

Figure D-18 shows Phase 2 of this capability.

Phase 1 (1998-2002)

- No change in capability.

Phase 2 (2003-2007)

- Oceanic surveillance via ADS-A (addressable) provides oceanic service providers more timely and more accurate position information about oceanic aircraft.

- Coordination between pilots and oceanic controllers is provided by a commercial communications service provider. For aircraft beyond the range of land-based VHF radio communications, the information transfer is by satellite or HF radio.
- ADS increases safety by enhancing situational awareness. It increases capacity by enabling reduced separation of traffic in oceanic airspace by providing controllers more accurate position and intent information about specific aircraft. Flexibility is improved by

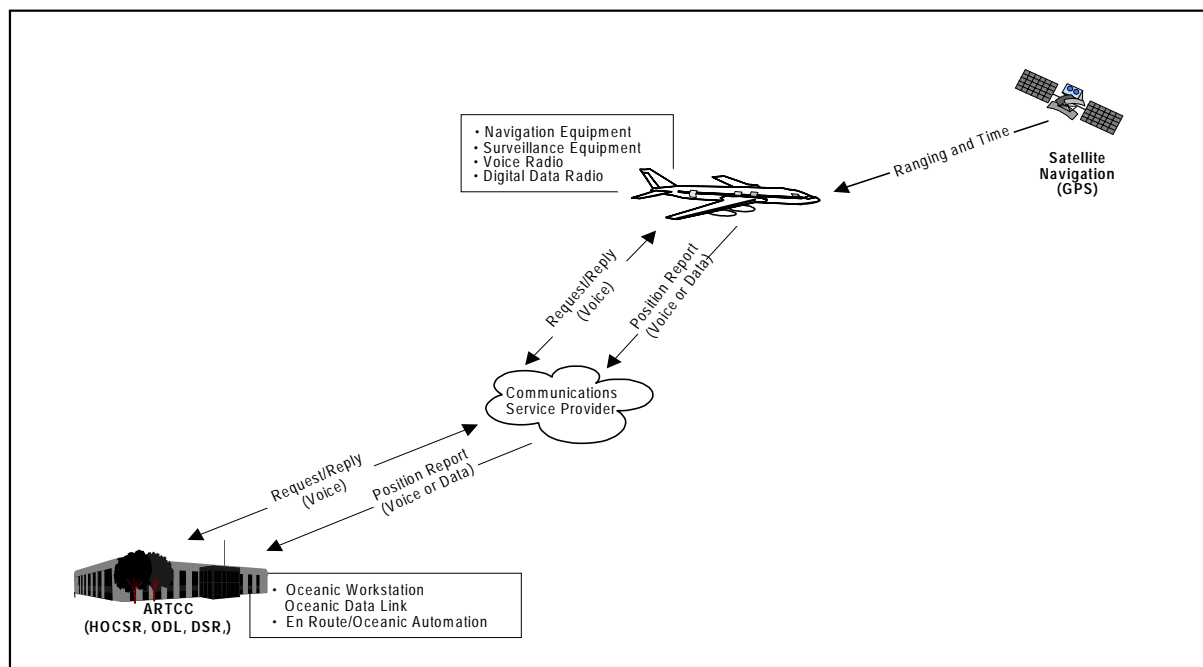


Figure D-18. Increased Surveillance Area Coverage, Air Traffic Services, Oceanic, Phase 2 (2003–2007)

better equipping the oceanic service provider to accommodate flight plan changes in-flight, such as requests for faster aircraft to pass slower aircraft.

Phase 3 (2008–2015)

- No additional change in capability.

6. Increased Digital Voice and Data Communication Among Service Providers and Pilots, Air Traffic Services, Tower/Airport Surface

Figures D-19 and -20 show Phases 1 and 2, respectively, of this capability.

Phase 1 (1998–2002)

- Limited terminal information (e.g., predeparture clearance (PDC), automated terminal information system (ATIS)) is delivered via data link to aircraft on the surface through a data communications service provider.
- VHF/UHF voice continues to be the primary means of communication.

Phase 2 (2003–2007)

- Predeparture clearance and ATIS terminal information is provided to the pilot via service provider data link at an expanded number of airports. This allows a specific set of data to be transmitted from the tower service provider to aircraft.

Phase 3 (2008–2015)

- No additional change in capability.

6. Increased Digital Voice and Data Communication Among Service Providers and Pilots, Air Traffic Services, En Route/Cruise

Figures D-21, -22, and -23 show Phases 1, 2, and 3, respectively, of this capability.

Phase 1 (1998–2002)

- Initial applications of controller-pilot data link (CPDLC Build 1) are limited to less complex and less safety-critical data link functions, such as initial contact, transfer of communications, predefined controller messages, and altimeter setting messages. Communications services are provided by a communications service provider.
- CPDLC Build 1A provides for national deployment of a limited set (18) of critical data link messages.
- Weather data collected in-flight by aircraft equipped with the Meteorological Data Collection and Reporting System (MDCRS) are downlinked via a communications service provider and used for weather forecasting.

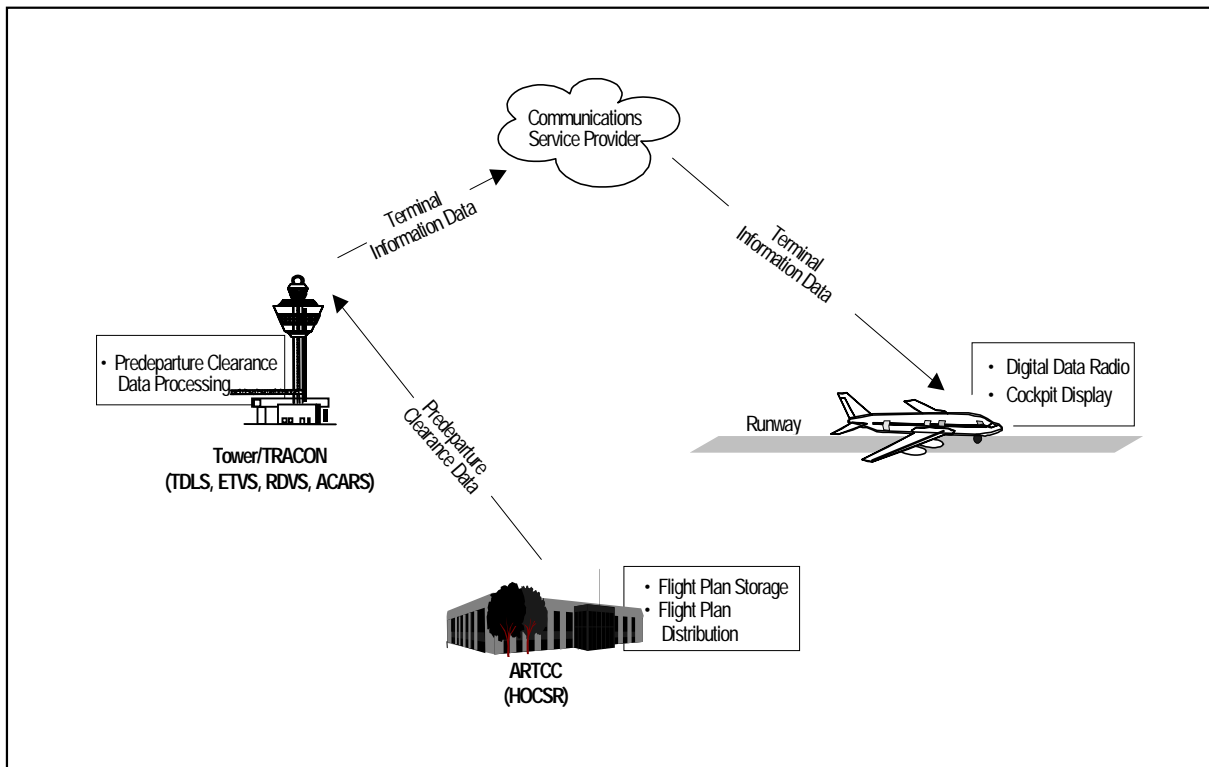


Figure D-19. Increased Digital Voice and Data Communications Among Service Providers and Pilots, Air Traffic Services, Tower/Airport Surface, Phase 1 (1998–2002)

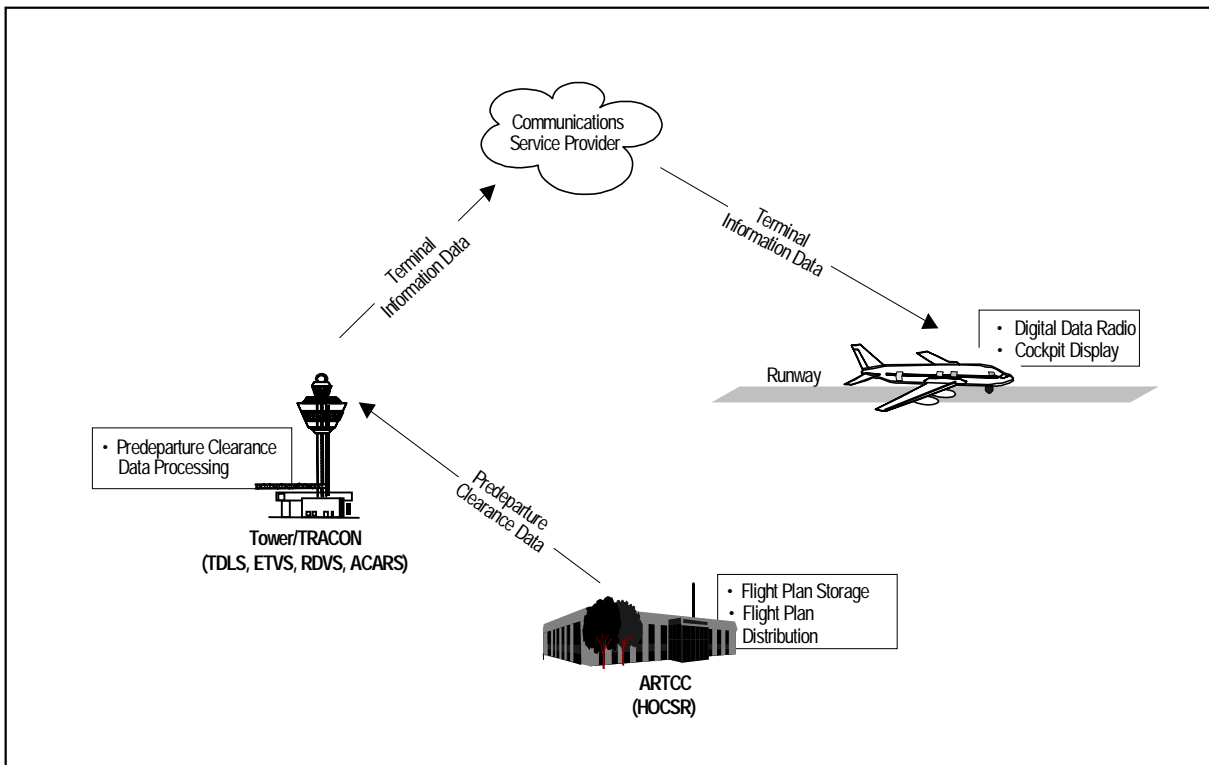


Figure D-20. Increased Digital Voice and Data Communications Among Service Providers and Pilots, Air Traffic Services, Tower/Airport Surface, Phase 2 (2003–2007)

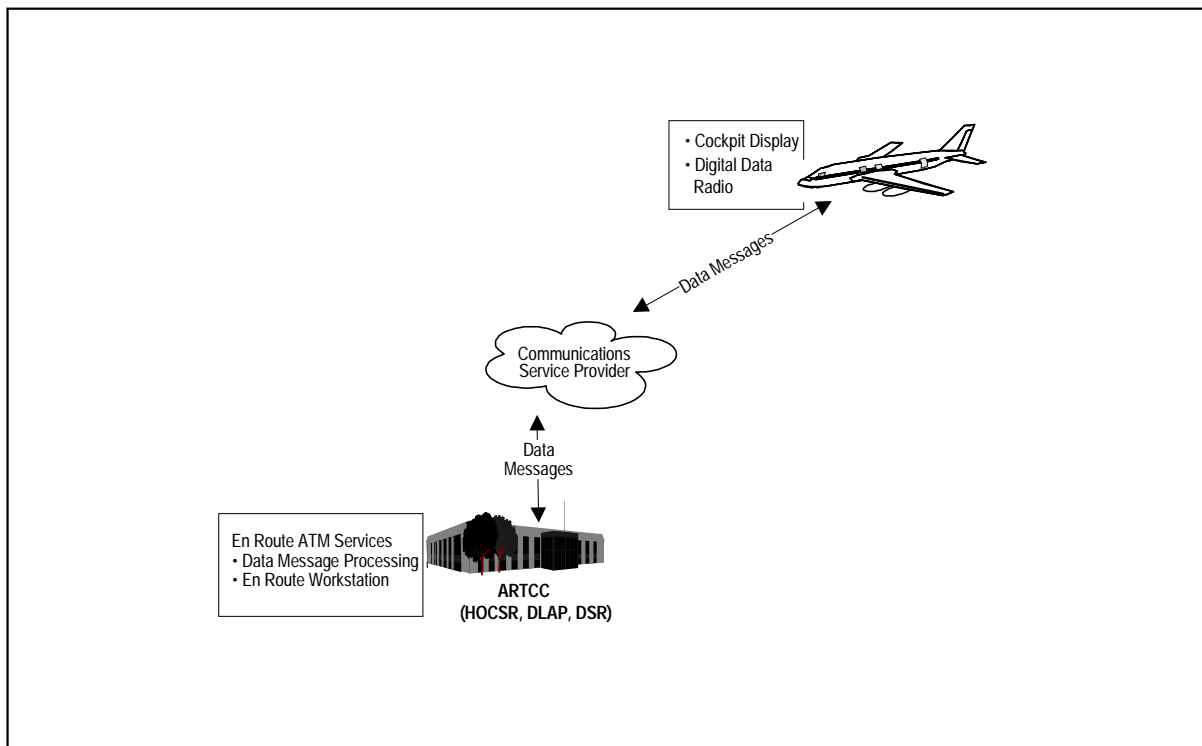


Figure D-21. Increased Digital Voice and Data Communications Among Service Providers and Pilots, Air Traffic Services, En Route/Cruise, Phase 1 (1998–2002)

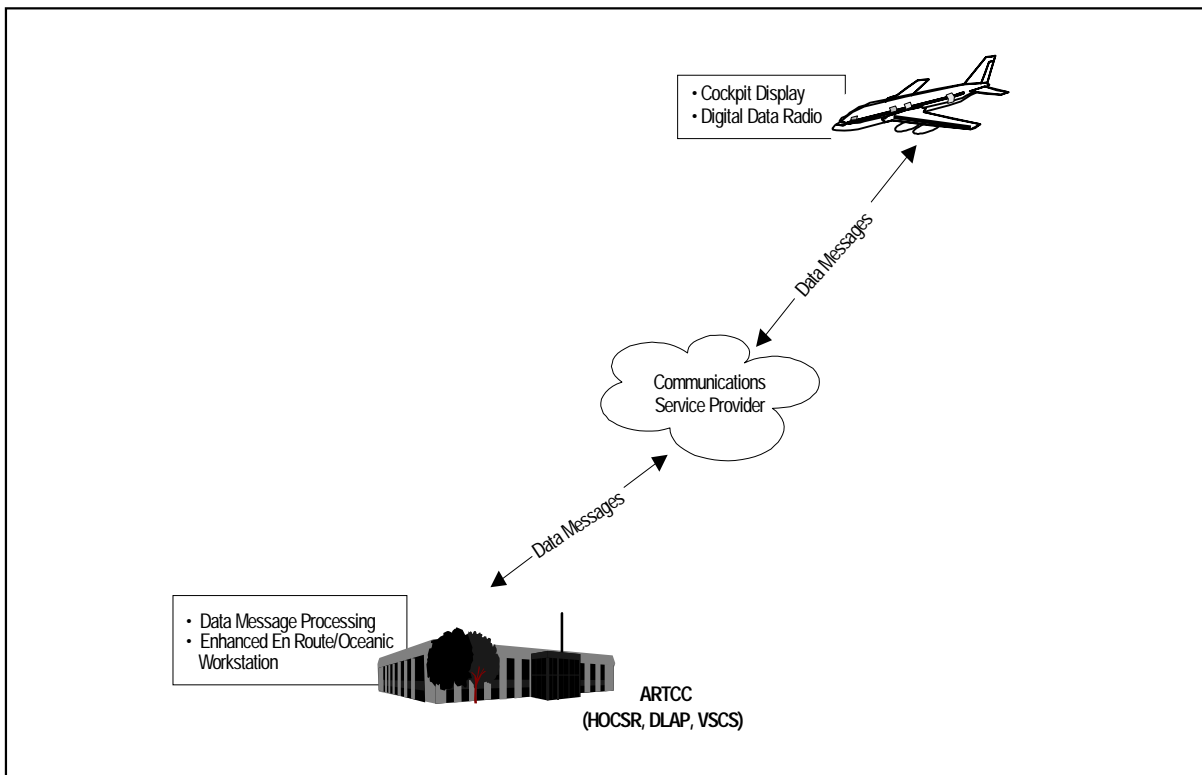


Figure D-22. Increased Digital Voice and Data Communications Among Service Providers and Pilots, Air Traffic Services, En Route/Cruise, Phase 2 (2003–2007)

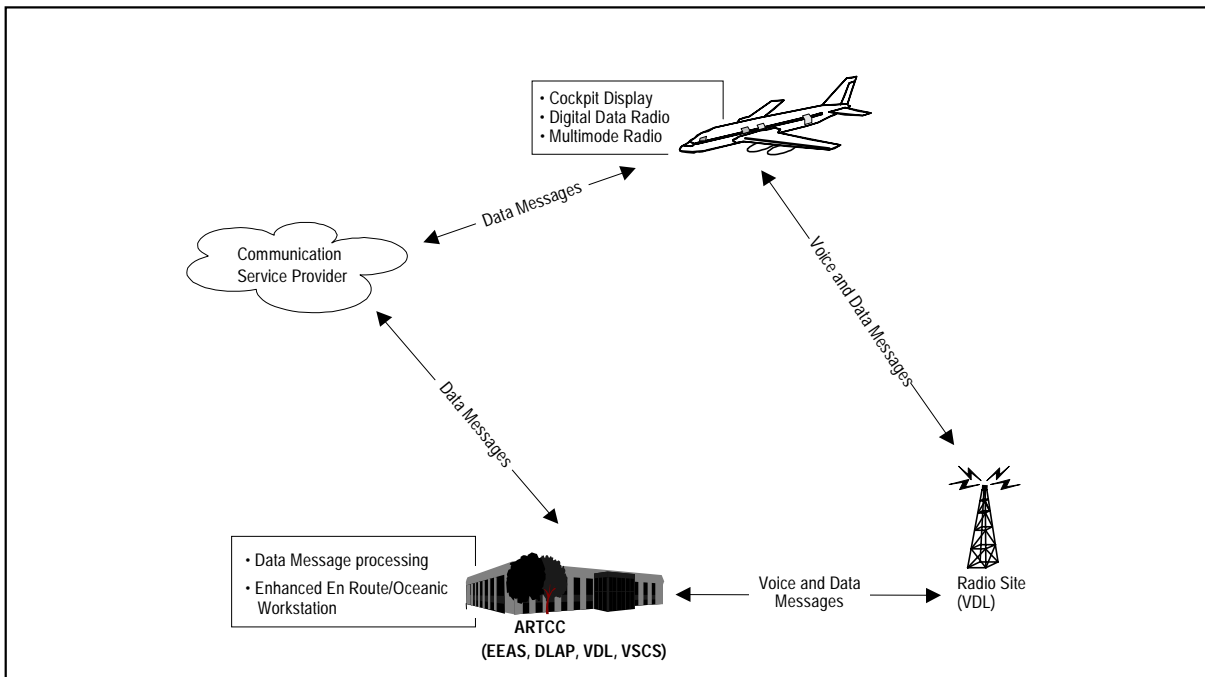


Figure D-23. Increased Digital Voice and Data Communications Among Service Providers and Pilots, Air Traffic Services, En Route/Cruise, Phase 3 (2008–2015)

Phase 2 (2003–2007)

- ATC data link services (CPDLC Build 2) are expanded to include an ATN-compliant message set via very high frequency digital link (VDL-2).

Phase 3 (2008–2015)

- ATC data link services, including CPDLC services, are expanded. VHF digital link (VDL-3) increases the capacity of data link. The introduction of digitized transmission increases the reliability of the communications links.

6. Increased Digital Voice and Data Communications Between Service Providers and Pilots, Air Traffic Services, Oceanic

Figure D-24 shows Phase 1 of this capability.

Phase 1 (1998–2002)

- Pilots provide voice messages, including position reports, to oceanic service providers through a communications service provider operator.
- A communications service provider provides two-way data link between the pilot and controller.

- Multisector oceanic data link provides controllers and pilots the ability to exchange digital data messages throughout oceanic airspace.

Phase 2 (2003–2007)

- No additional change in capability.

Phase 3 (2008–2015)

- Same functionality as En Route/Cruise.

6. Increased Digital Voice and Data Communications Between Service Providers and Pilots, Air Traffic Services, NAS-Wide

Figure D-25 shows Phase 3 of this capability.

Phase 1 (1998–2002)

- No change in capability.

Phase 2 (2003–2007)

- No change in capability.

Phase 3 (2008–2015)

- Digital voice and data communications between service providers and pilot using CPDLC Build 3 via VDL-Mode 3 increase.

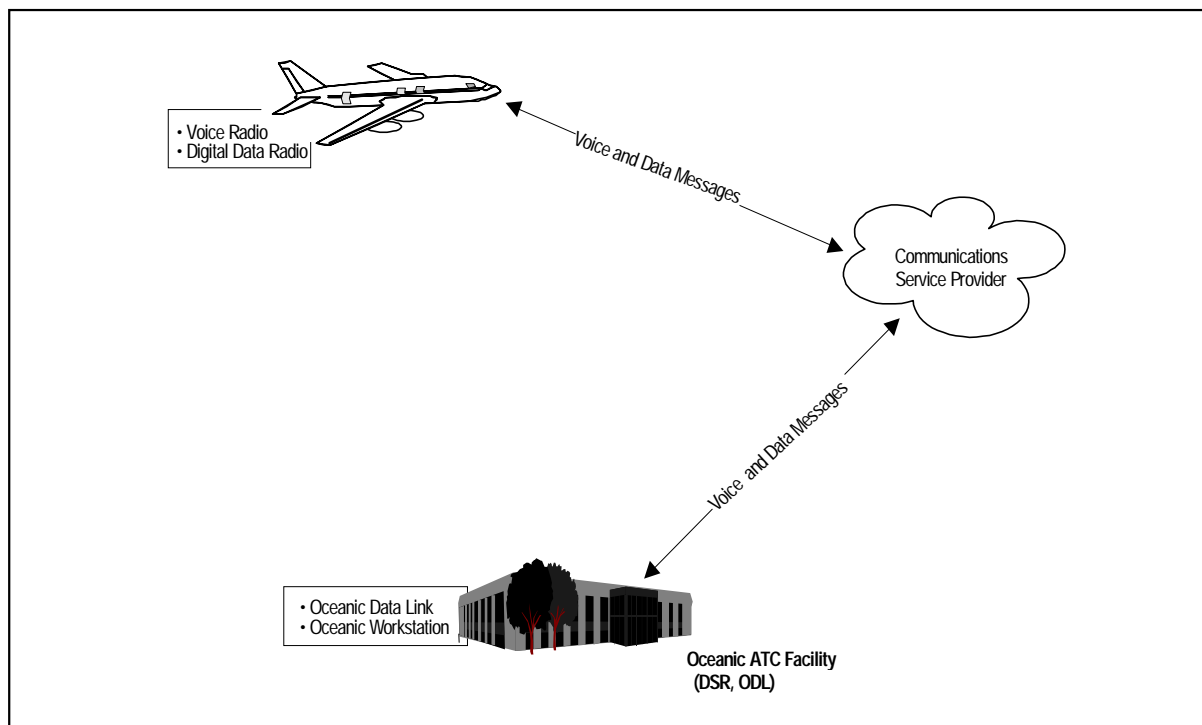


Figure D-24. Increased Digital Voice and Data Communications Between Service Providers and Pilots, Air Traffic Services, Oceanic, Phase 1 (1998–2002)

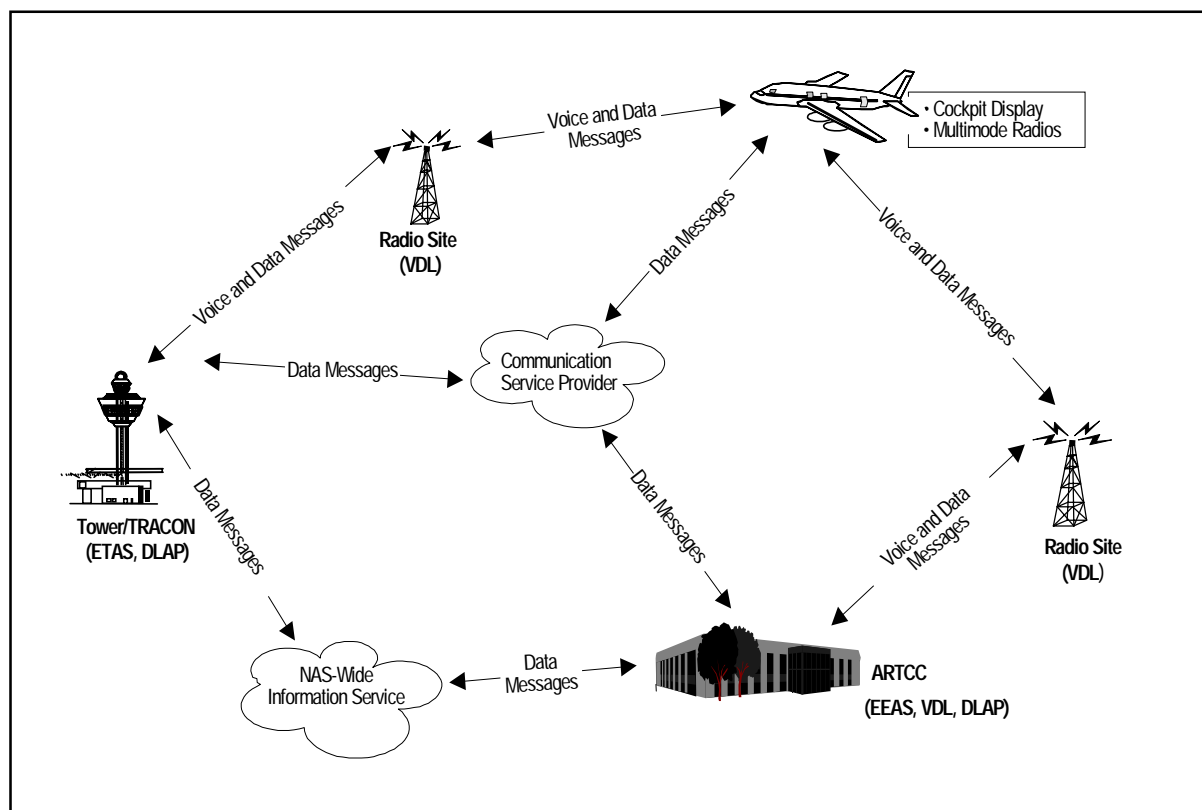


Figure D-25. Increased Digital Voice and Data Communications Between Service Providers and Pilots, Air Traffic Services, NAS-Wide, Phase 3 (2008–2015)

- Service providers and pilots directly exchange digital messages, such as flight information service (FIS) and Traffic Information Service (TIS) information, throughout the NAS using NAS-wide data link.

7. Improved Flight Plan Negotiation, Air Traffic Services, NAS-Wide

Figure D-26 shows Phase 3 of this capability.

Phase 1 (1998–2002)

- No change in capability.

Phase 2 (2003–2007)

- No change in capability.

Phase 3 (2008–2015)

- A new flight object replaces the existing flight plan. The flight object is a 4-dimensional interactive flight profile that is continually monitored and updated throughout an aircraft's active flight. The new flight object contains many more fields of information and conforms to international standards.
- The flight object is activated at aircraft push-back from the departure gate and remains active until engine shutdown at the destination airport.

- The enhanced en route automation system (EEAS) and enhanced terminal automation system (ETAS) use the flight object to automatically approve and monitor diverse departure and arrival paths as well as en route flight trajectories. Flight conformance monitoring, conflict detection, and recommended resolutions are fully automated during this time period.

8. Improved Arrival and Departure Sequencing and Spacing for Tactical Traffic Flow, Air Traffic Services, Arrival/Departure

Figures D-27 and -28 show Phases 1 and 3, respectively, of this capability.

Phase 1 (1998–2002)

- Introduction of metering tools introduces automation to assist en route service providers in feeding aircraft to airport approach controls at a predetermined rate.
- The Final Approach Spacing Tool (FAST) assists service providers in sequencing and spacing aircraft in high-density terminal areas.

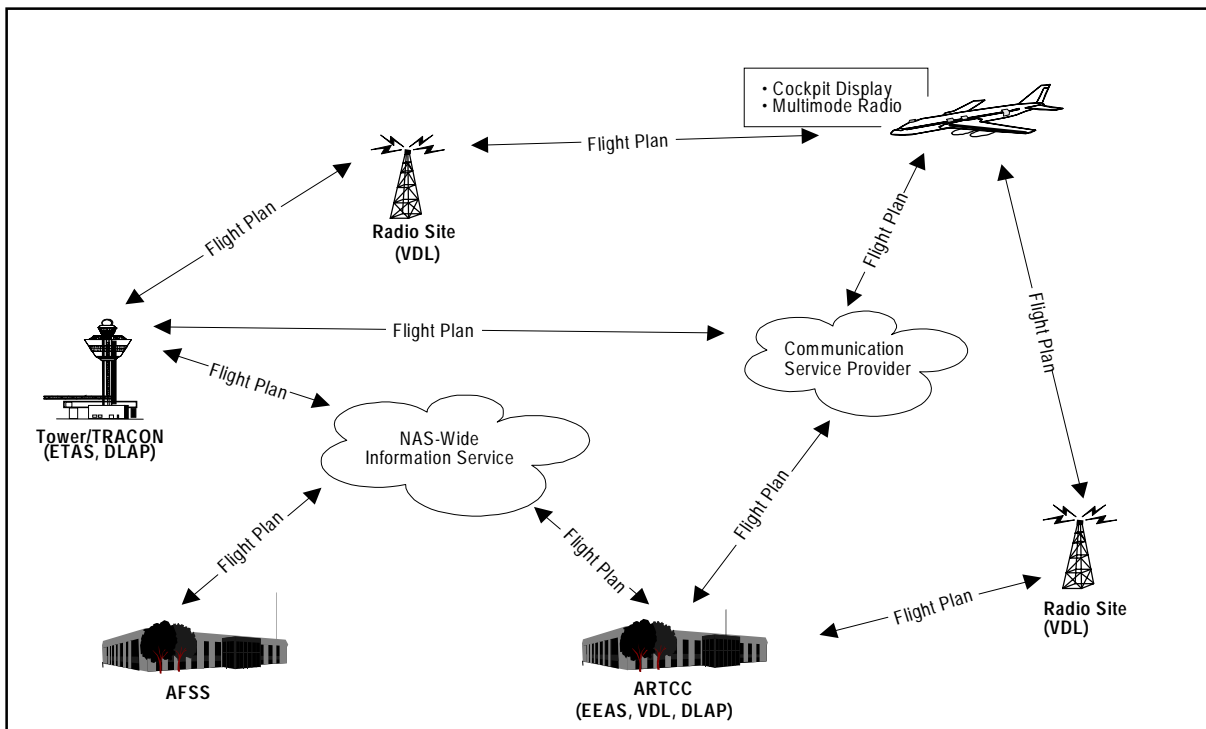


Figure D-26. Improved Flight Plan Negotiation, Air Traffic Services, NAS-Wide, Phase 3 (2008–2015)

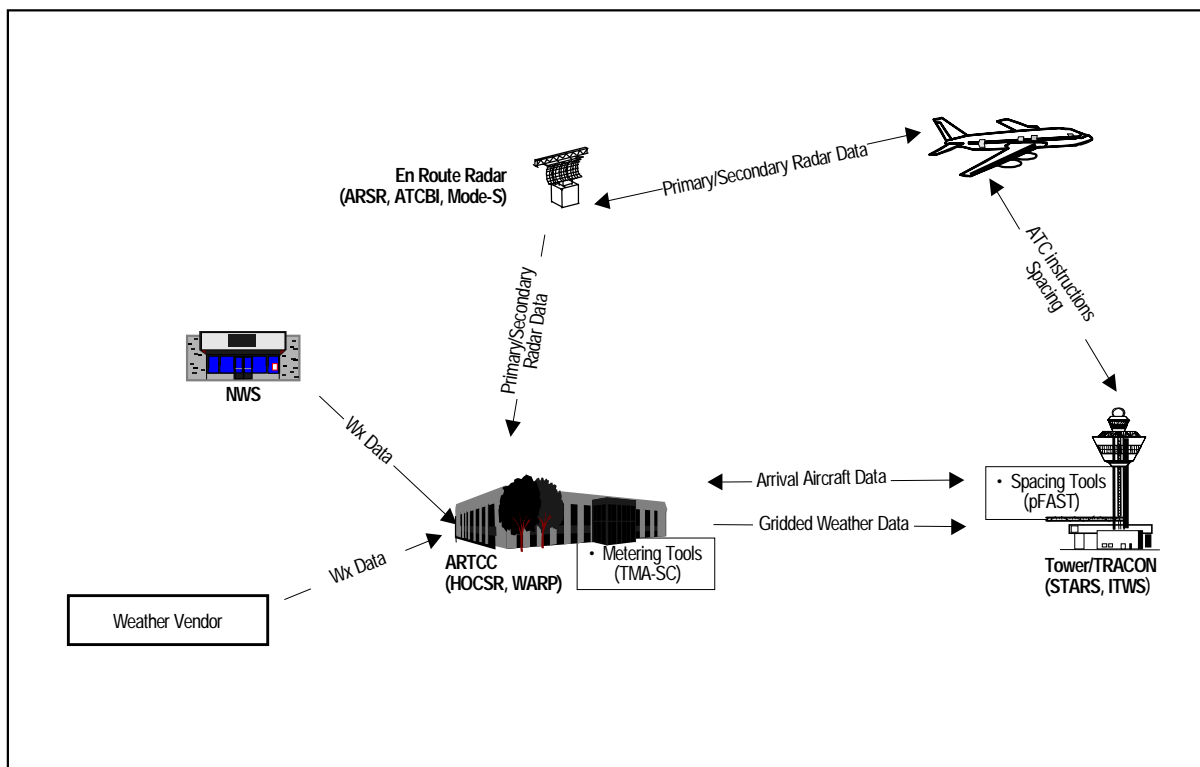


Figure D-27. Improved Arrival and Departure Sequencing and Spacing for Tactical Traffic Flow, Air Traffic Services, Arrival/Departure, Phase 1 (1998–2002)

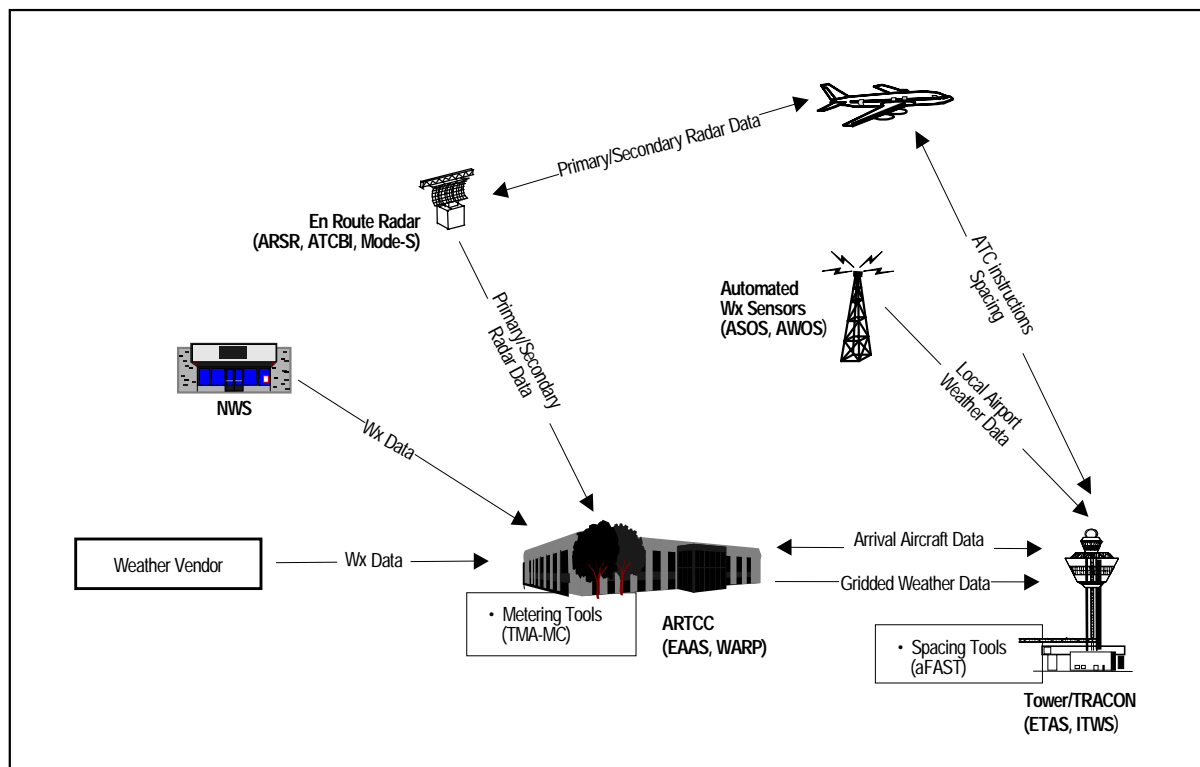


Figure D-28. Improved Arrival and Departure Sequencing and Spacing for Tactical Traffic Flow, Air Traffic Services, Arrival/Departure, Phase 3 (2008–2015)

Phase 2 (2003–2007)

- No additional change in capability.

Phase 3 (2008–2015)

- Enhanced final approach spacing tools incorporate additional parameters (i.e., wake vortex, aircraft performance, user preferences) to fine-tune sequencing and spacing of arriving aircraft.

8. Improved Arrival and Departure Sequencing and Spacing for Tactical Traffic Flow, Air Traffic Services, En Route/Cruise

Figures D-29 and -30, show Phases 1 and 2, respectively, of this capability.

Phase 1 (1998–2002)

- Introduction of metering tools introduces automation to assist en route service providers in feeding aircraft to airport approaches at a predetermined rate.

Phase 2 (2003–2007)

- Air Traffic Management automation tools recommend a course of action to service providers for smoothing traffic flows to maximize airport capacity utilization.

- Multicenter processing of traffic flow increases system capacity utilization.

- Descent advisory tools provide en route service providers recommended tip of “descent points,” which makes maximum use of aircraft descent profiles.

Phase 3 (2008–2015)

- No additional change in capability.

9. Increased Flexibility in Flying User-Preferred Routes, Air Traffic Services, En Route/Cruise

Figures D-31, -32, and -33 show Phases 1, 2, and 3, respectively, of this capability.

Phase 1 (1998–2002)

- User request evaluation tool (URET) is available at several facilities to assist controllers in predicting aircraft-to-aircraft conflicts. The service provider’s resolution of detected conflict is communicated to the cockpit via the existing VHF/UHF radio system.

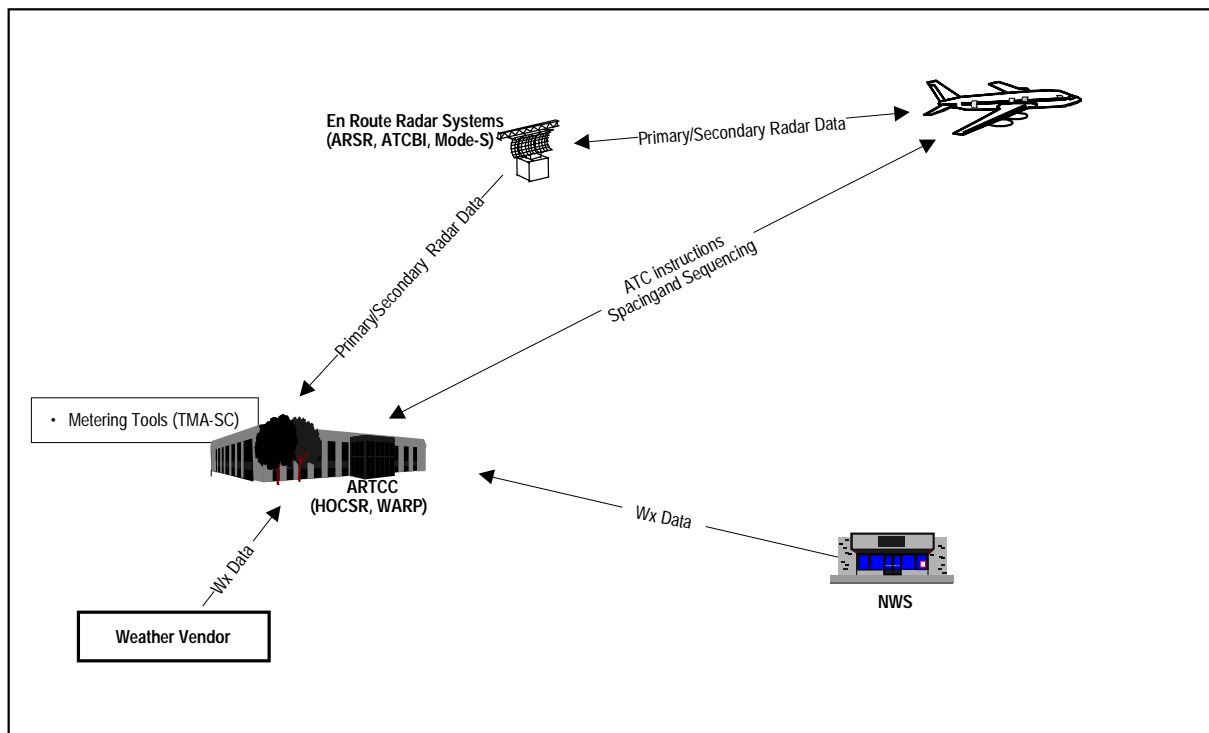


Figure D-29. Improved Arrival and Departure Sequencing and Spacing for Tactical Traffic Flow, Air Traffic Services, En Route/Cruise, Phase 1 (1998–2002)

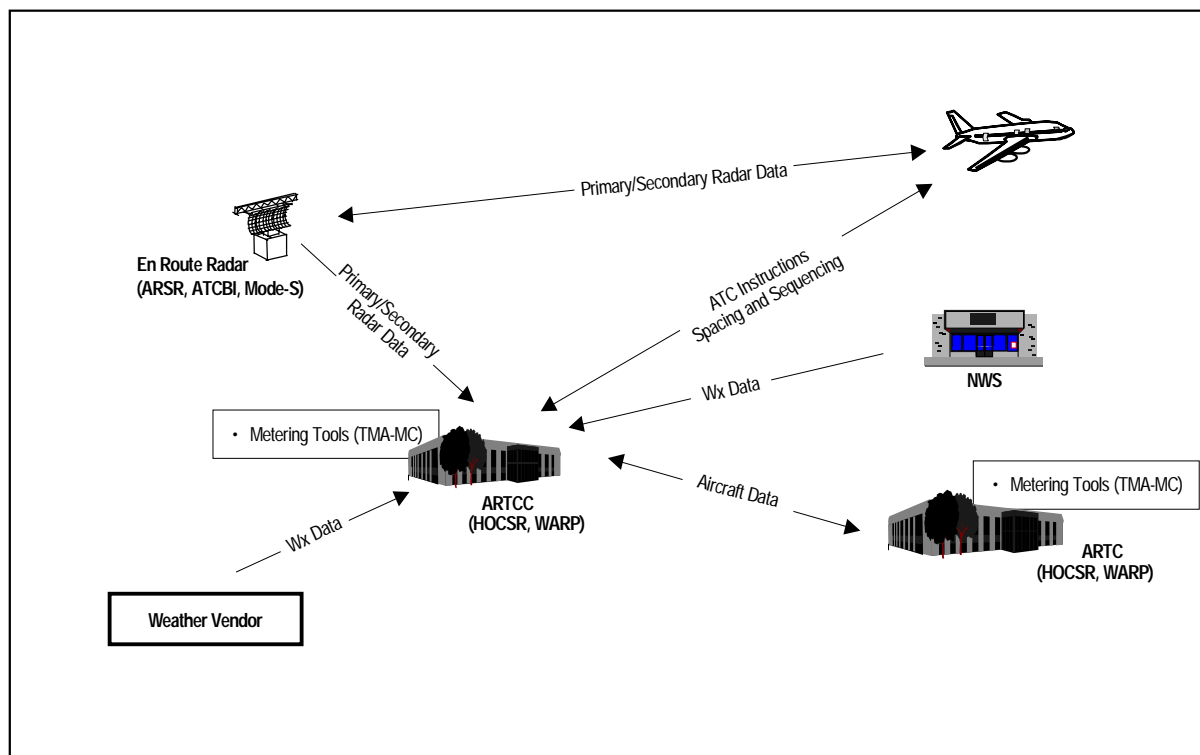


Figure D-30. Improved Arrival and Departure Sequencing and Spacing for Tactical Traffic Flow, Air Traffic Services, En Route/Cruise, Phase 2 (2003–2007)

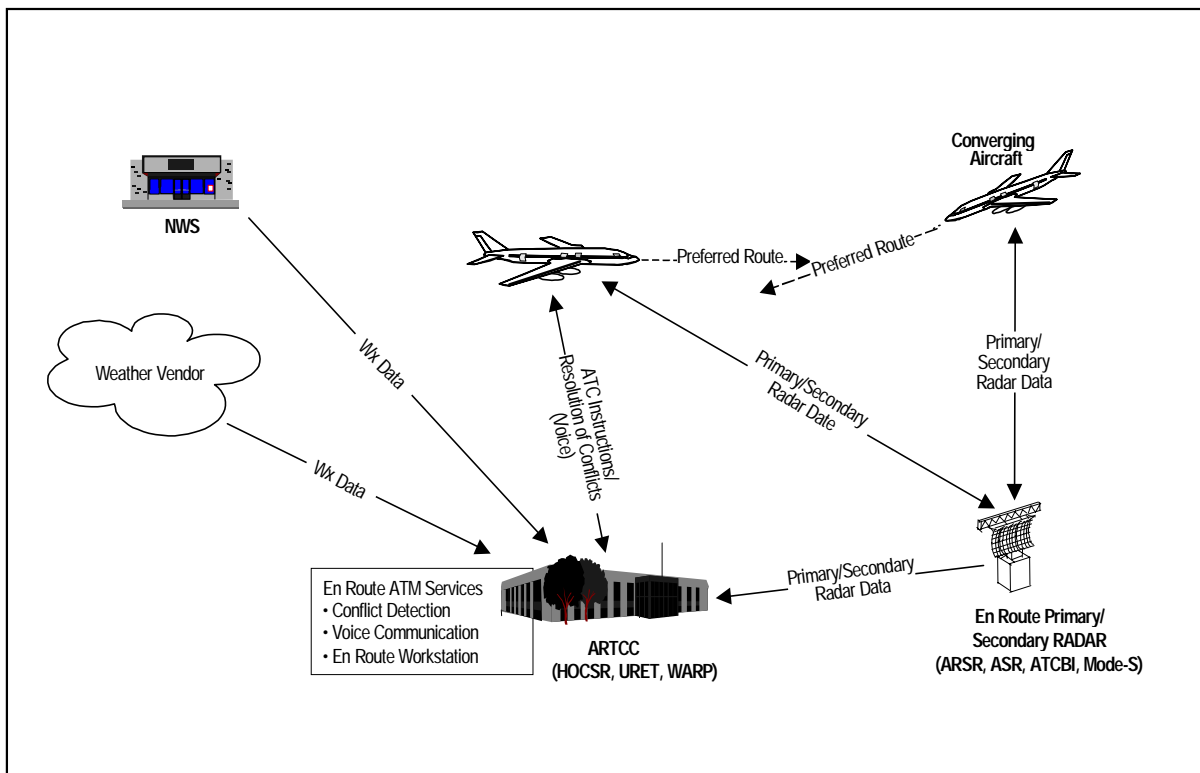


Figure D-31. Increased Flexibility in Flying User-Preferred Routes, Air Traffic Services, En Route/Cruise, Phase 1 (1998–2002)

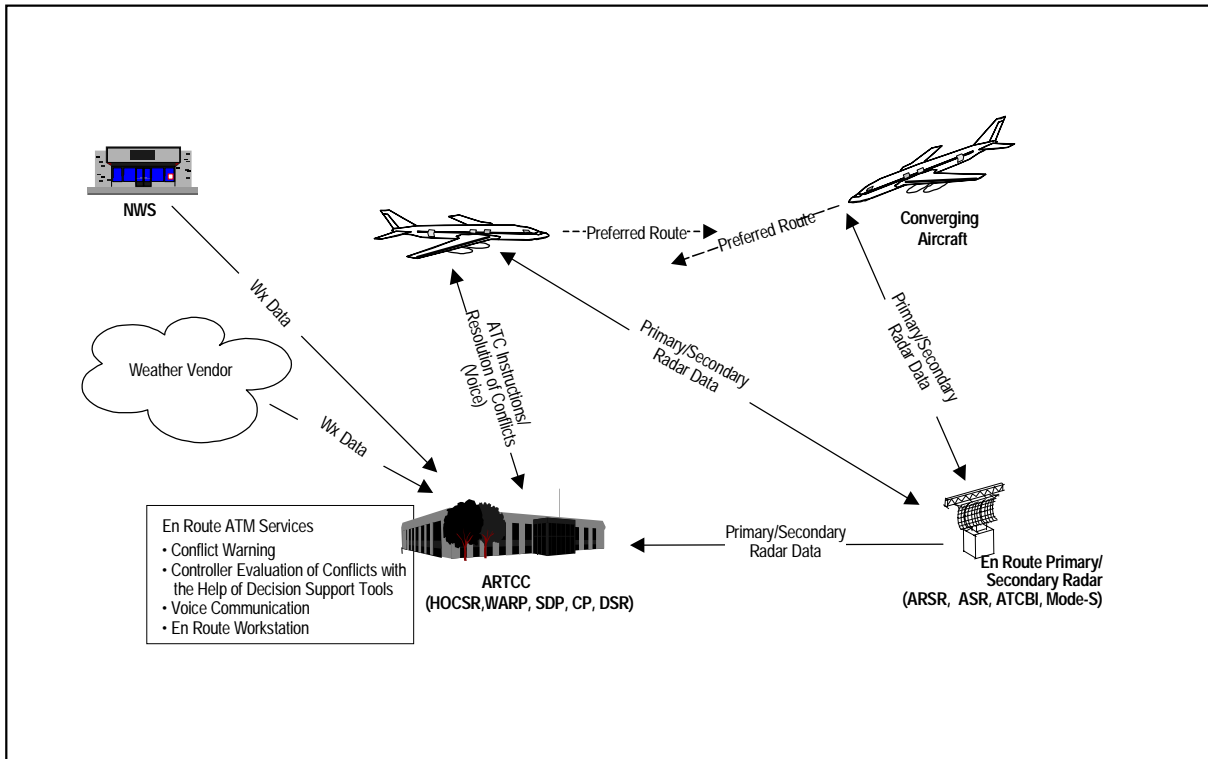


Figure D-32. Increased Flexibility in Flying User-Preferred Routes, Air Traffic Services, En Route/Cruise, Phase 2 (2003–2007)

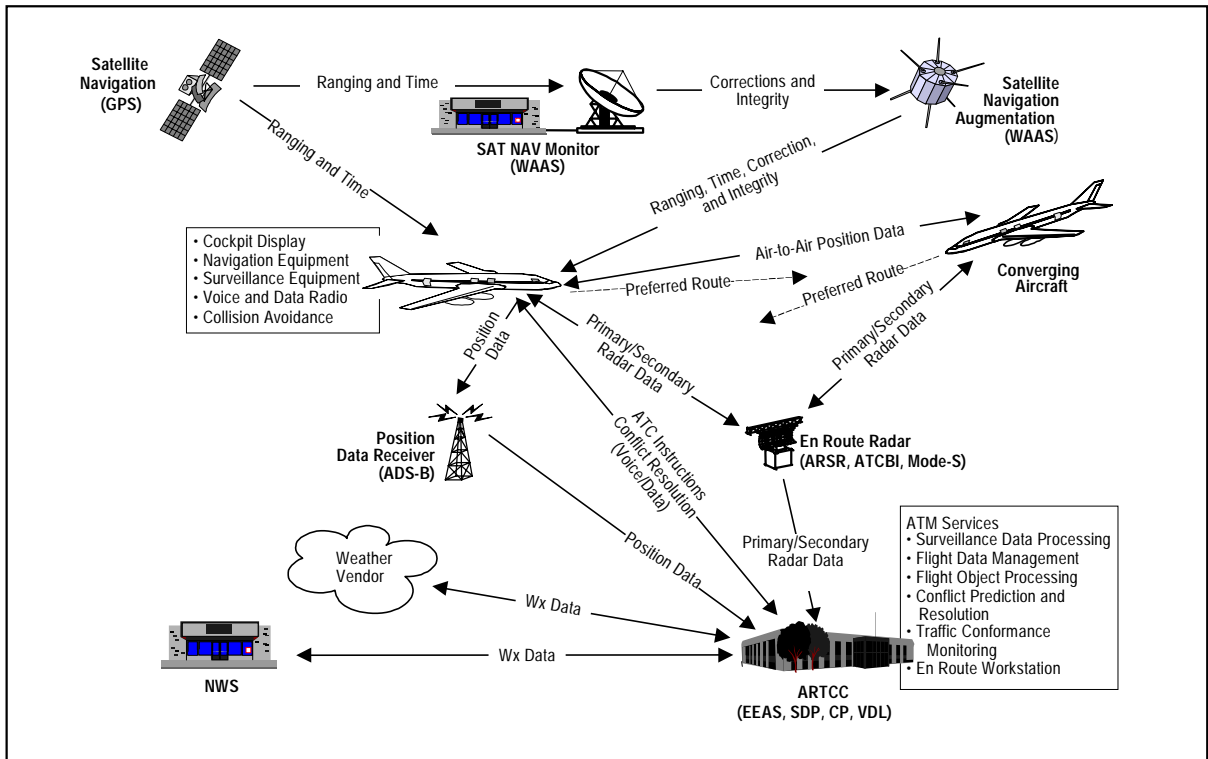


Figure D-33. Increased Flexibility in Flying User-Preferred Routes, Air Traffic Services, En Route/Cruise, Phase 3 (2008–2015)

Phase 2 (2003–2007)

- The ability to predict potential flight conflicts is enhanced by a limited national deployment version of conflict probe to selected sites.

Phase 3 (2008–2015)

- Flight object processing, integrated data link, and ATC/traffic flow management (TFM) decision support system (DSS) applications evolve and are integrated to assist controllers with conflict prediction and recommend actions to avoid the conflict. Conflict probe will be enhanced and deployed nationwide as a conflict probe with multicenter metering and integrated into the en route radar position workstation. The improved conflict probe provides better conflict resolution for evaluation by service providers. Implementation of flight object processing and the NAS-wide information network allows end-to-end checking of aircraft flight paths.

10. Increased Airspace Capacity, Air Traffic Services, Oceanic

Figures D-34 and -35 show Phases 1 and 2, respectively, of this capability.

Phase 1 (1998–2002)

- Reduced vertical separation minimum (RVSM) will allow increased airspace capacity, increased use of optimum altitude profile and increased flexibility of strategic and tactical control.
- RVSM-enabling capabilities involve aircraft avionics (enhanced altimeters, Mode-C transponder, altitude alert system, and automatic altitude hold system).
- Reduction of the separation minima is achieved through improved accuracy and timeliness of ADS-A position reports (from properly equipped aircraft) and enhancements to ground-based automation equipment.
- Air-air position reports provide additional data to enhance pilot awareness of nearby aircraft.
- Addressable automatic dependent surveillance position reports are periodically transmitted to the oceanic automation system via a communications service provider communications link.

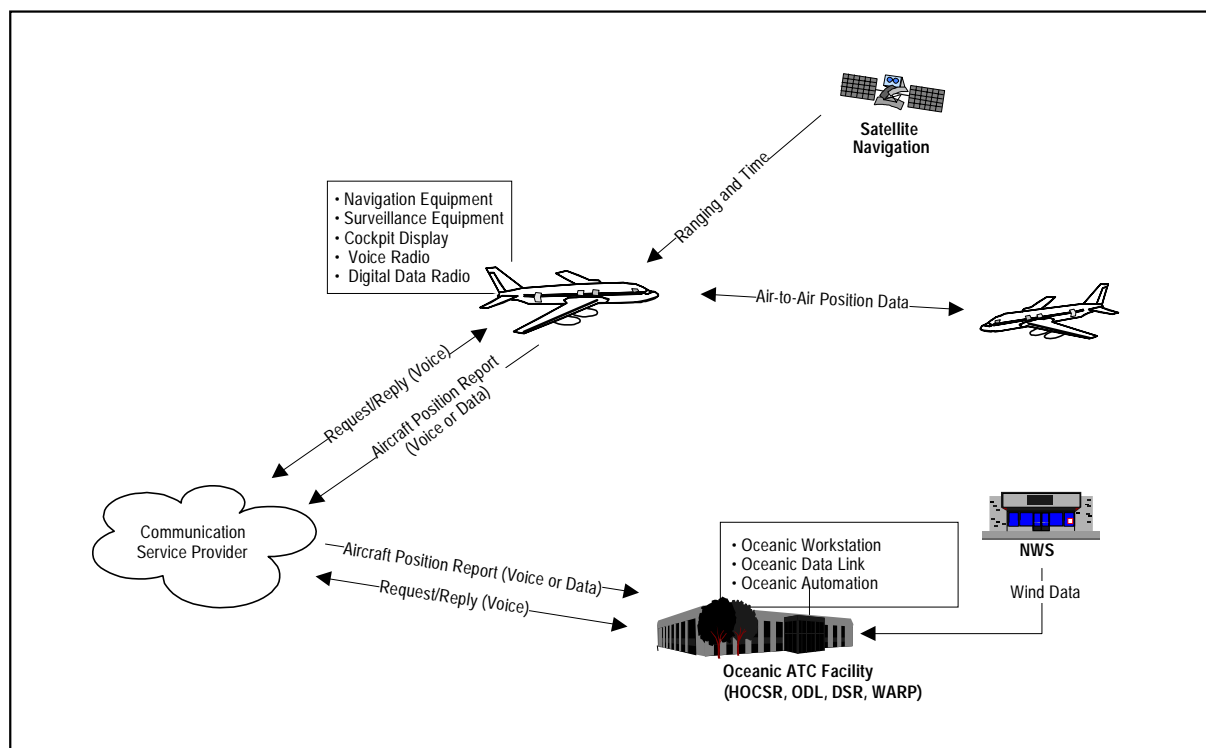


Figure D-34. Increased Airspace Capacity, Air Traffic Services, Oceanic, Phase 1 (1998–2002)

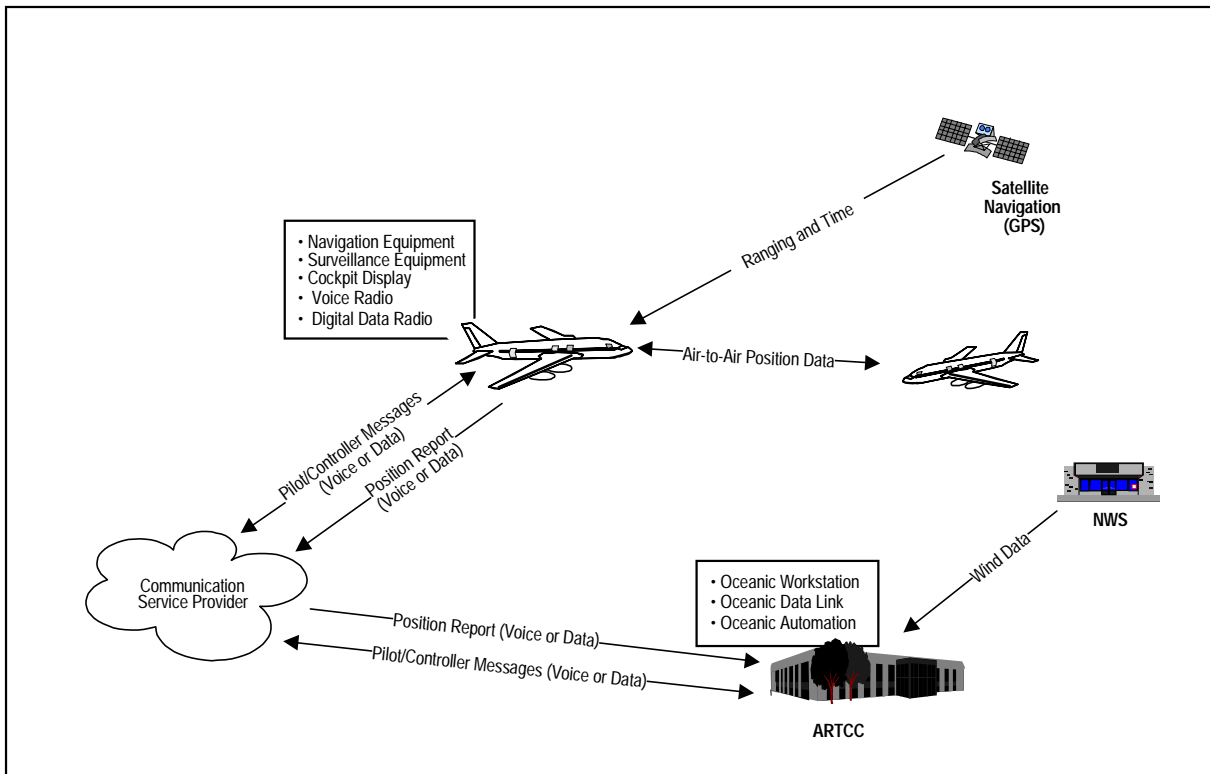


Figure D-35. Increased Airspace Capacity, Air Traffic Services, Oceanic, Phase 2 (2003–2007)

- Oceanic automation uses updated wind data to identify optimal tracks, while projecting aircraft movement to identify airspace competition and availability.

Phase 2 (2003–2007)

- Two-controller access provides oceanic service providers with the capability to distribute traffic workload and handling data-link equipped aircraft during peak traffic times.
- Reduced horizontal separation minimum to 50 lateral, 50 longitudinal will reduce crossing traffic complexity as well as create the potential for more optimum routings to reduce flight time and fuel consumption.
- 50/50 separation requires direct pilot-controller communication, required navigation performance (RNP)-10, and ADS.

Phase 3 (2008–2015)

- Same functionality as En Route/Cruise.

11. Improved Surface Traffic Management, Air Traffic Services, Tower/Airport Surface

Figures D-36,- 37, and -38 show Phases 1, 2, and 3, respectively, of this capability.

Phase 1 (1998–2002)

- As an aircraft approaches the runway, tracks from beacon radar returns are merged with surface radar tracks to automatically associate the track with the flight identification. The automation function continues to track the aircraft on the airport surface, displaying its position and identification to ground service providers.
- As an aircraft backs away from the boarding gate, the flight identification and surface surveillance returns are associated. The aircraft is tracked and displayed on a surface surveillance display.
- The surface surveillance function displays a map of the airport on the surface surveillance display to help ground service providers monitor the surface situation.
- Taxiway lights and signs (taxiway markers) provide visual guidance to flight crews on the airport surface.

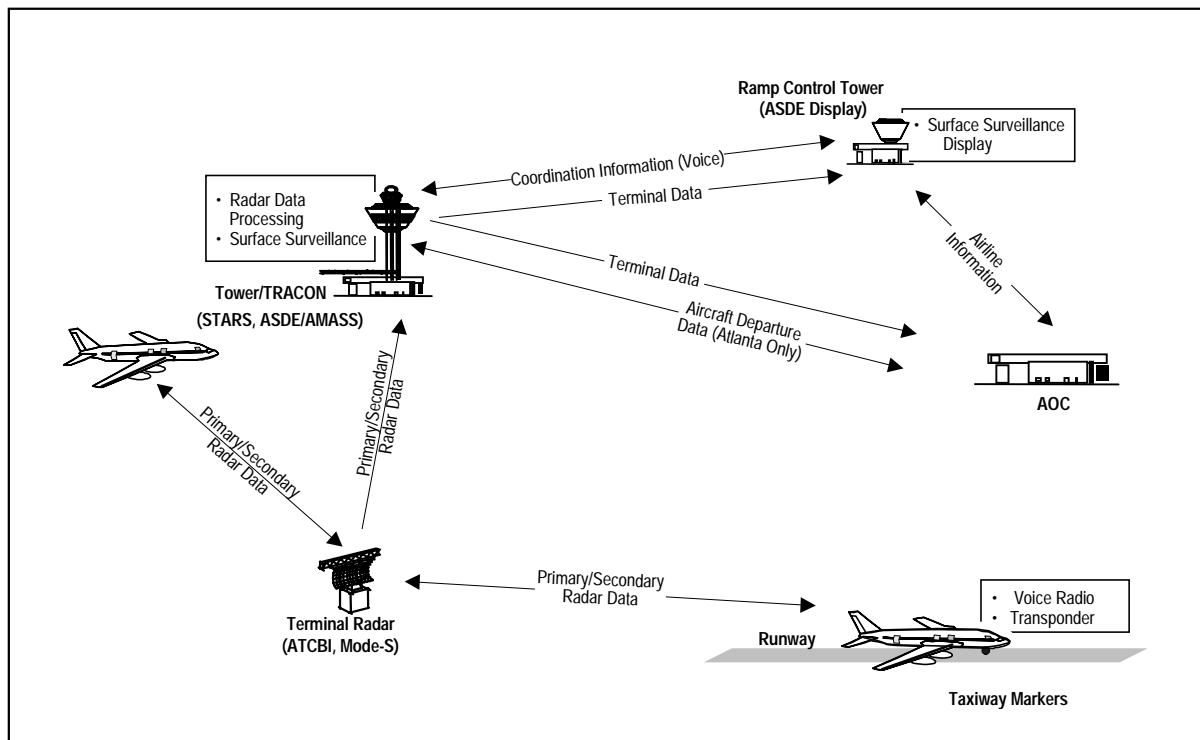


Figure D-36. Improved Surface Traffic Management, Air Traffic Services, Tower/Airport Surface, Phase 1 (1998–2002)

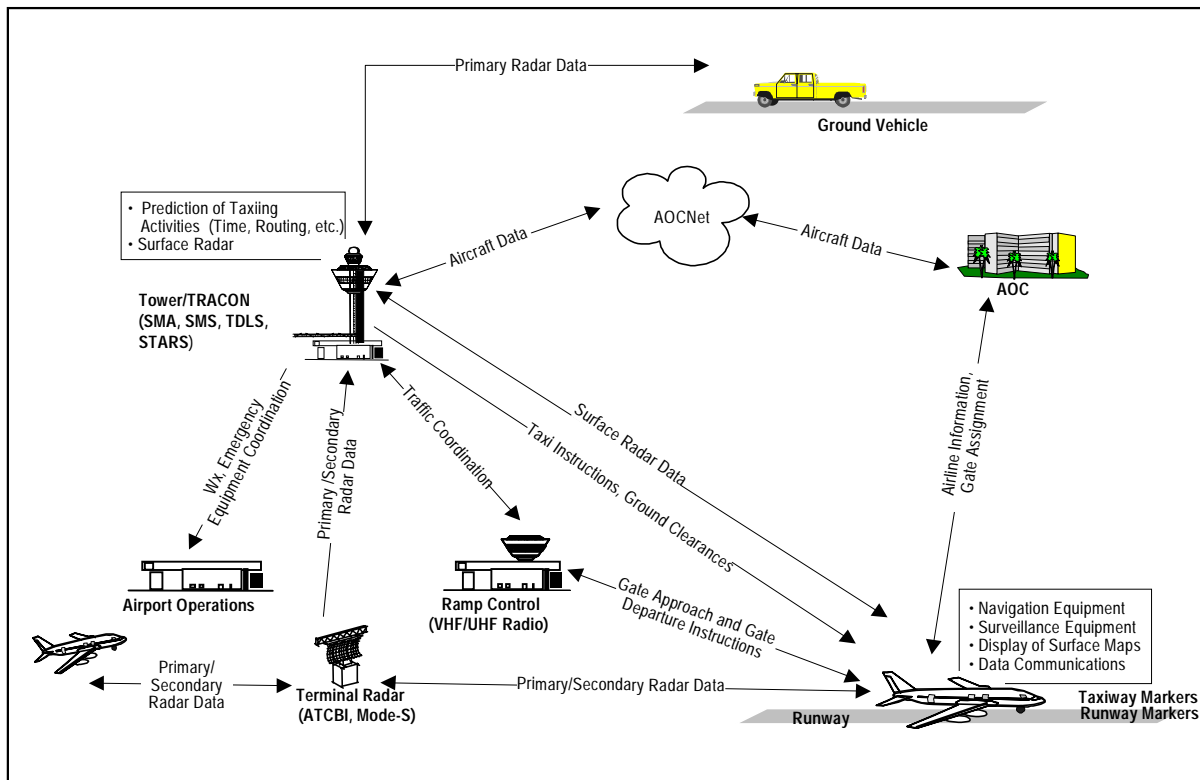


Figure D-37. Improved Surface Traffic Management, Air Traffic Services, Tower/Airport Surface, Phase 2 (2003–2007)

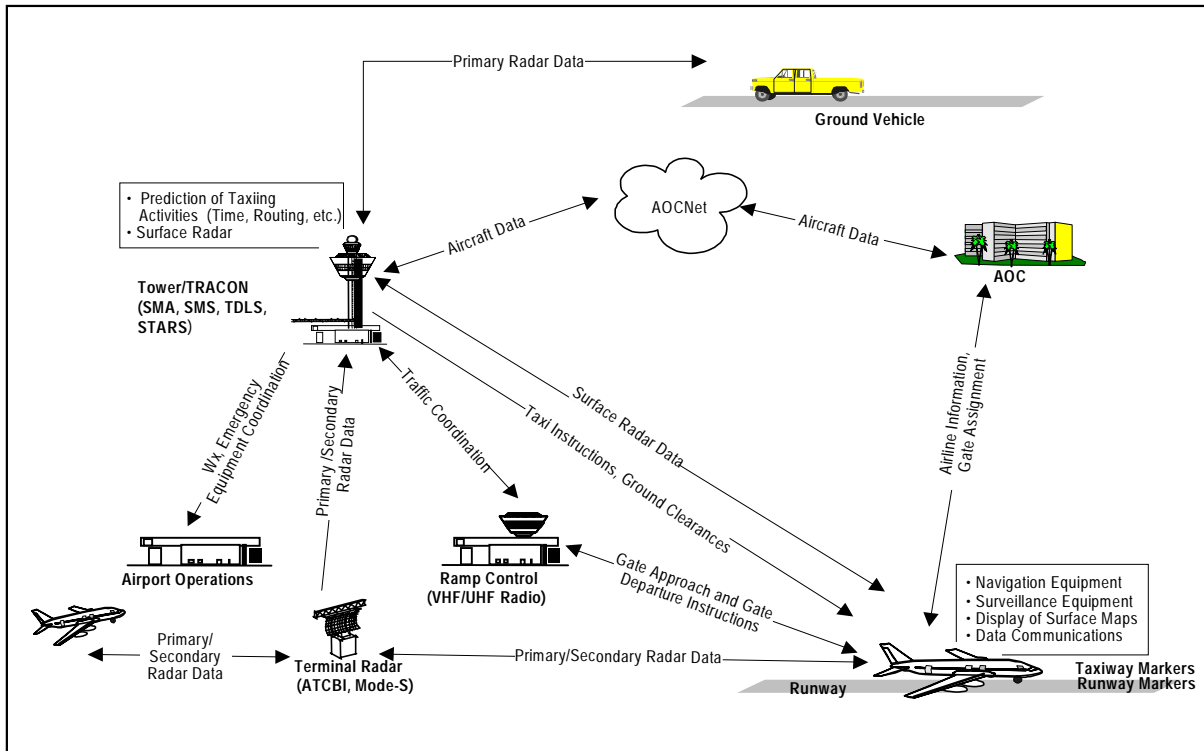


Figure D-38. Improved Surface Traffic Management, Air Traffic Services, Tower/Airport Surface, Phase 3 (2008–2015)

Phase 2 (2003–2007)

- Integrated situation display of airport surface and terminal data assists the service provider in managing the airport area.
- Introducing networking technology in the tower environment significantly decreases the time delay for delivery of critical traffic information to the service providers, airline personnel, and airport operations.

Phase 3 (2008–2015)

- Introducing global positioning local augmentation increases the accuracy of the position data from both surface vehicular and aircraft traffic. The additional data are provided to improve the situational awareness of service providers and pilots. Data fusion further enhances the accuracy of position data presented to the service provider.
- Introducing airport surface maps in the cockpit provides additional data to assist flight crews in improving their situational awareness.

12. Increased Low-Altitude Direct Routes, Air Traffic Services, NAS-Wide

Figures D-39 and -40 show Phases 1 and 2, respectively, of this capability.

Phase 1 (1998–2002)

- Aircraft will navigate direct using WAAS, and its position will be derived, where possible, from en route surveillance radar.

Phase 2 (2003–2007)

- Aircraft will navigate direct using WAAS, and its position will be determined by ATC from either the en route surveillance radar or a terminal radar system.
- Aircraft will navigate direct using WAAS, and its position will be determined from ADS-B.

Phase 3 (2008–2015)

- No additional change in capability.

13. Increased Availability of Aeronautical Information to Service Providers and NAS Users, Air Traffic Services, NAS-Wide

Figure D-41 shows Phase 3 of this capability.

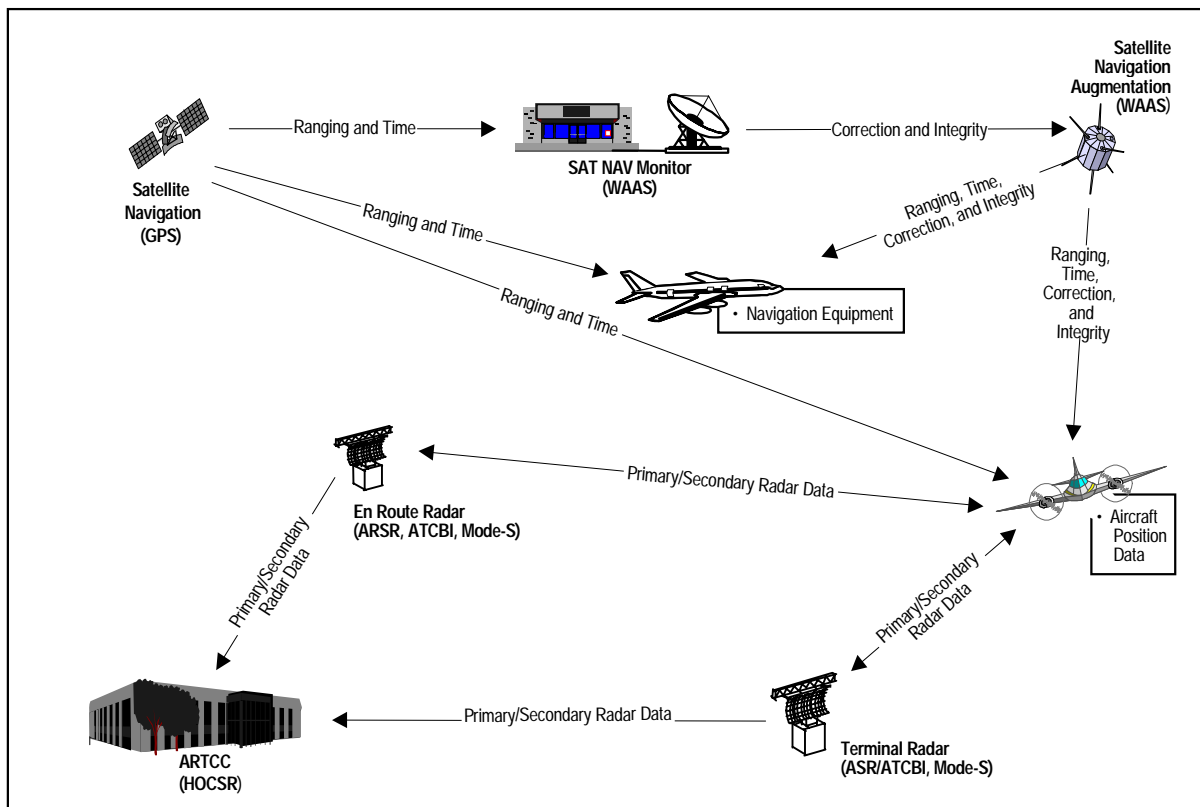


Figure D-39. Increased Low-Altitude Direct Routes, Air Traffic Services, NAS-Wide, Phase 1 (1998–2002)

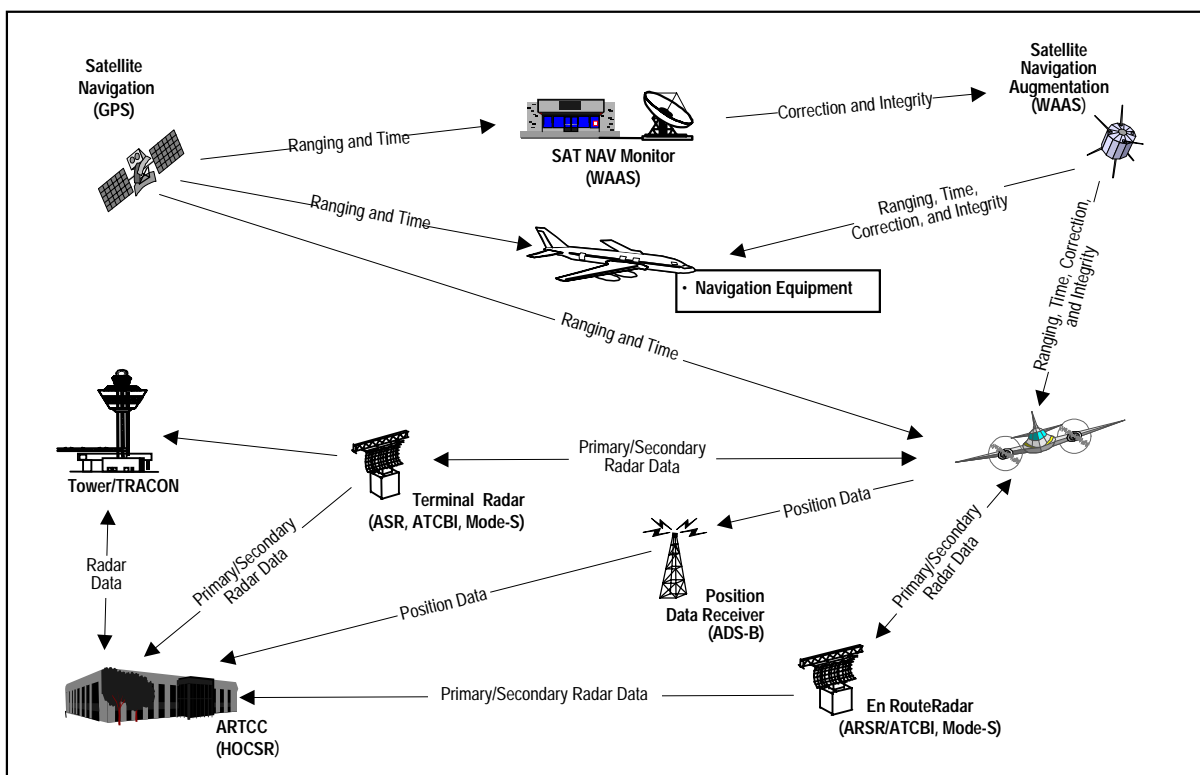


Figure D-40. Increased Low-Altitude Direct Routes, Air Traffic Services, NAS-Wide, Phase 2 (2003–2007)

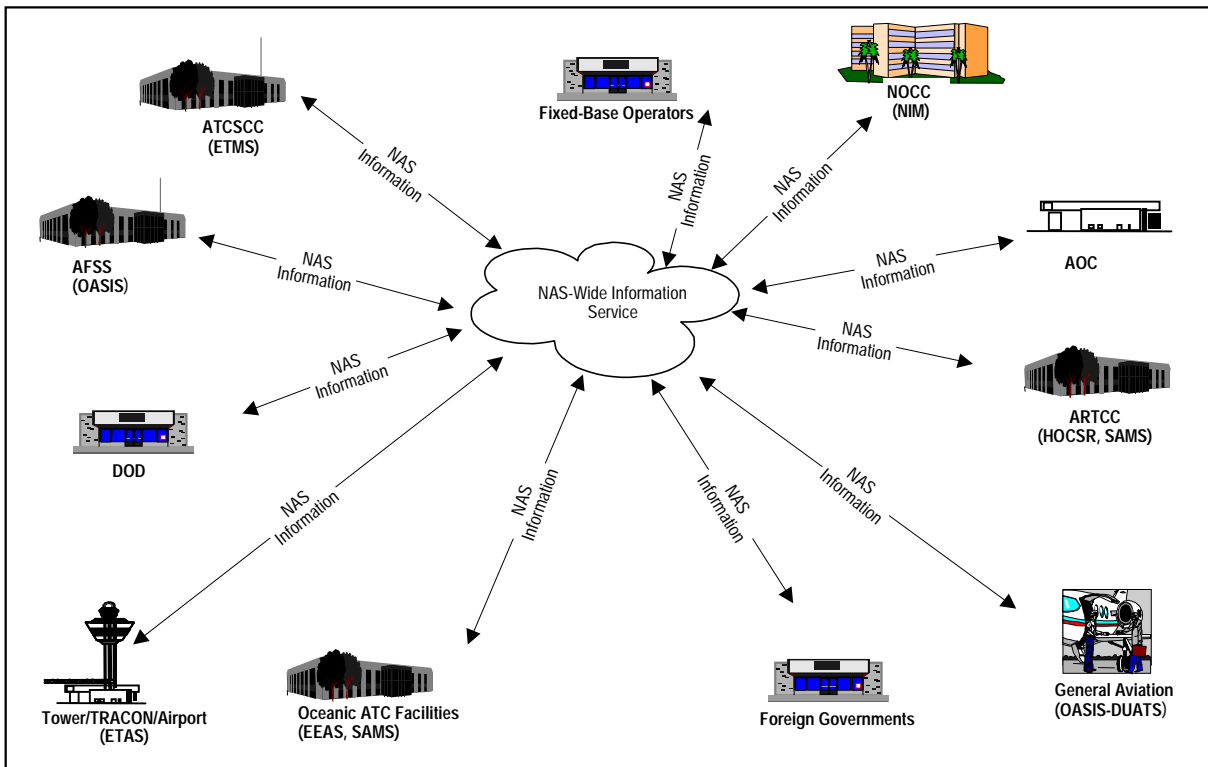


Figure D-41. Increased Availability of Aeronautical Information to Service Providers and NAS Users, Air Traffic Services, NAS-Wide, Phase 3 (2008–2015)

Phase 1 (1998–2002)

- No change in capability.

Phase 2 (2003–2007)

- No change in capability.

Phase 3 (2008–2015)

- A NAS-wide information-sharing system is established to provide real-time exchange of NAS data. The data include NAS operational and maintenance status, weather, FAA facility status, and AOC and DOD operations information.
- Information systems security measures are in place to ensure data integrity.

14. Improved Collaborative Decisionmaking Between Service Providers and NAS Users for Strategic Planning, NAS Management Services, Traffic Management

Figures D-42, -43, and -44 show Phases 1, 2, and 3, respectively, of this capability.

Phase 1 (1998–2002)

- The introduction and integration of traffic management tools significantly enhance the collaborative decisionmaking process.
- As ATC automation tools begin to share strategic traffic flow messages, the collaborative decisionmaking process will mature. The dedicated airline operations network provides schedule information to the ATCSCC. This information can be coordinated with ARTCC and major terminal facilities in real time.

Phase 2 (2003–2007)

- Flight plan evaluation is based on a real-time exchange of data via a local area network (LAN) and a wide area network (WAN) that will provide a rapid two-way exchange of aeronautical information used by strategic planners in the FAA as well as the airlines, private industry, and the DOD.
- NAS flight operations are monitored for real-time compliance, and system-level impact assessments are readily available to all system users.

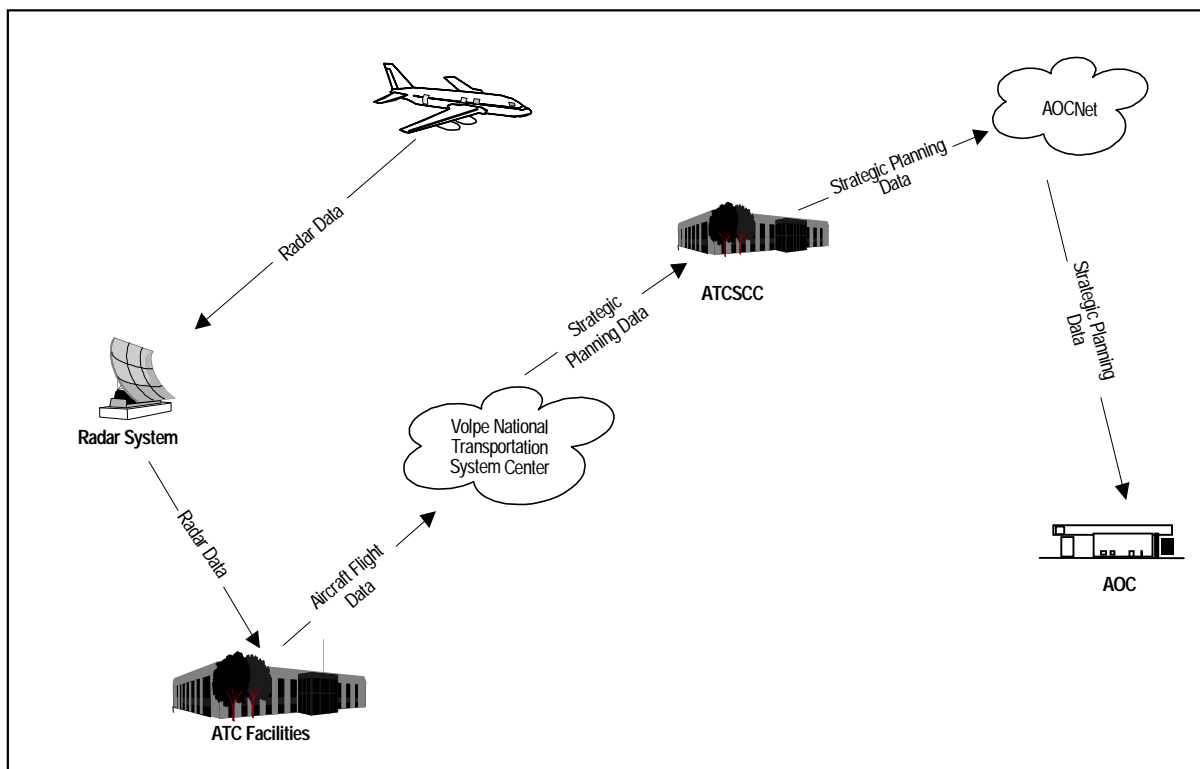


Figure D-42. Improved Collaborative Decisionmaking Between Service Providers and NAS Users for Strategic Planning, NAS Management Services, Traffic Management, Phase 1 (1998–2002)

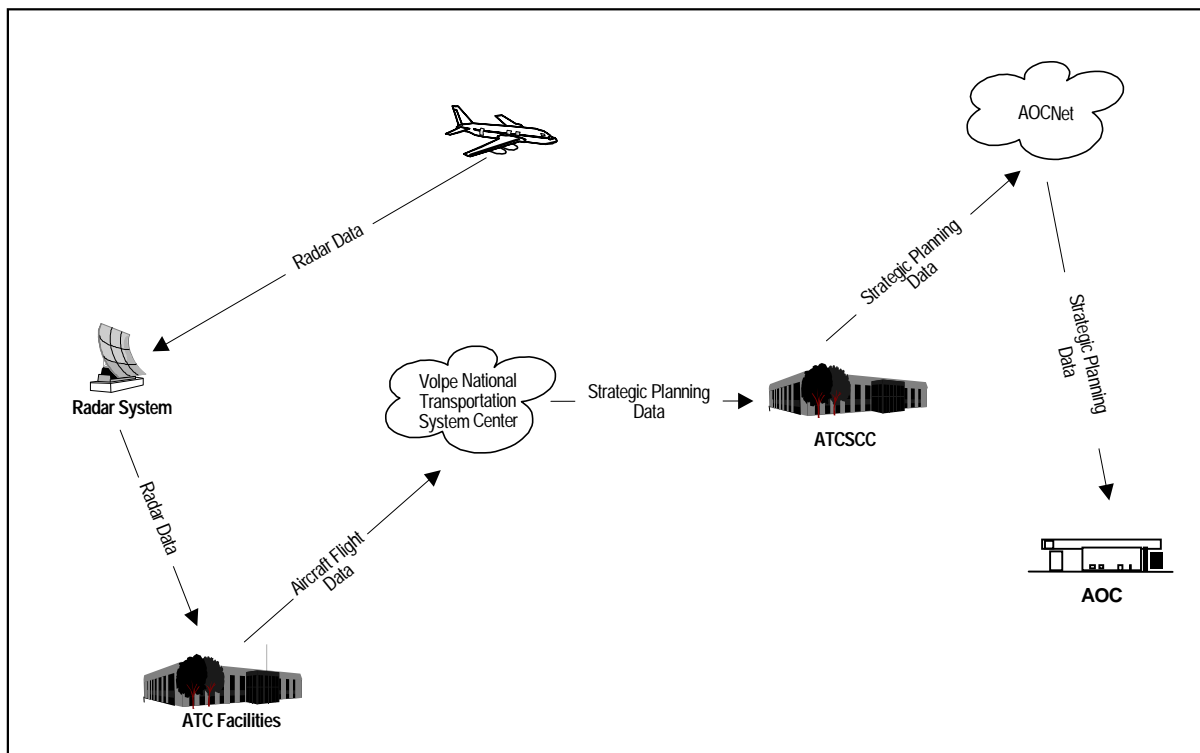


Figure D-43. Improved Collaborative Decisionmaking Between Service Providers and NAS Users for Strategic Planning, NAS Management Services, Traffic Management, Phase 2 (2003–2007)

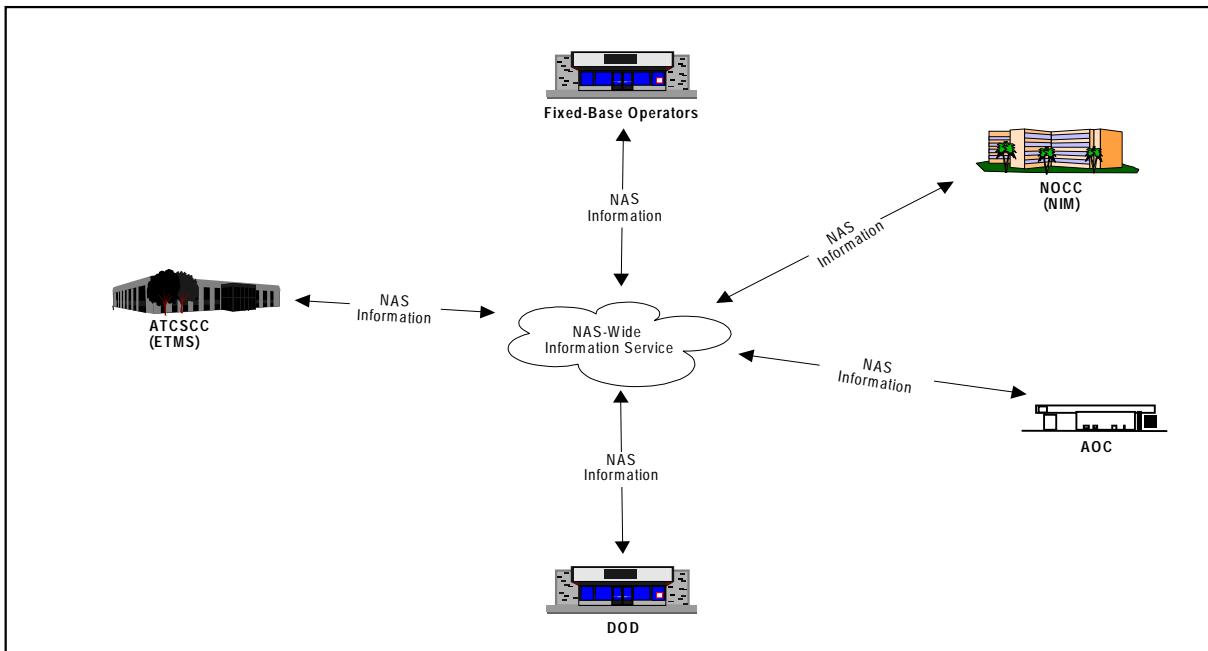


Figure D-44. Improved Collaborative Decisionmaking Between Service Providers and NAS Users, NAS Management Services, Traffic Management, Phase 3 (2008–2015)

- Airline resources effectiveness is increased through closer airline operations center (AOC)/NAS coordination and the ability to evaluate impacts on a fleet basis.

Phase 3 (2008–2015)

- Systemwide CDM provides for a real-time exchange of NAS aeronautical information used by strategic planners in the FAA as well as the airlines, DOD, and private industry.
- Strategic decision support tools use common data sets for data processing and distributing the results to all system users.
- NAS flight operations are monitored for real-time compliance, and system-level impact assessments are readily available to all system users.

15. Increased Ability To Support Search and Rescue Activities, NAS Management Services, NAS Information

Figure D-45 shows Phase 3 of this capability.

Phase 1 (1998–2002)

- No change in capability.

Phase 2 (2003–2007)

- No change in capability.

Phase 3 (2008–2015)

- Aircraft are equipped with satellite navigation and emit a 406 MHz signal that will be detected by one or more satellites, which then relay the aircraft positions to the National Oceanic and Atmospheric Administration (NOAA). The aircrafts' downed positions are then transmitted to the rescue coordination center.
- Normal emergency frequencies are monitored 24 hours a day and when they are detected, ATC facilities are notified. Once a true emergency has been confirmed, flight plan data and last-known position are forwarded to the rescue coordination center.

16. Improved Infrastructure Maintenance Management, NAS Management Services, Infrastructure Management

Figures D-46, -47, and -48 show Phases 1, 2, and 3, respectively, of this capability.

Phase 1 (1998–2002)

- NAS systems are continually monitored for acceptable performance. Reports of anomalies are transmitted to an operations control center (OCC).

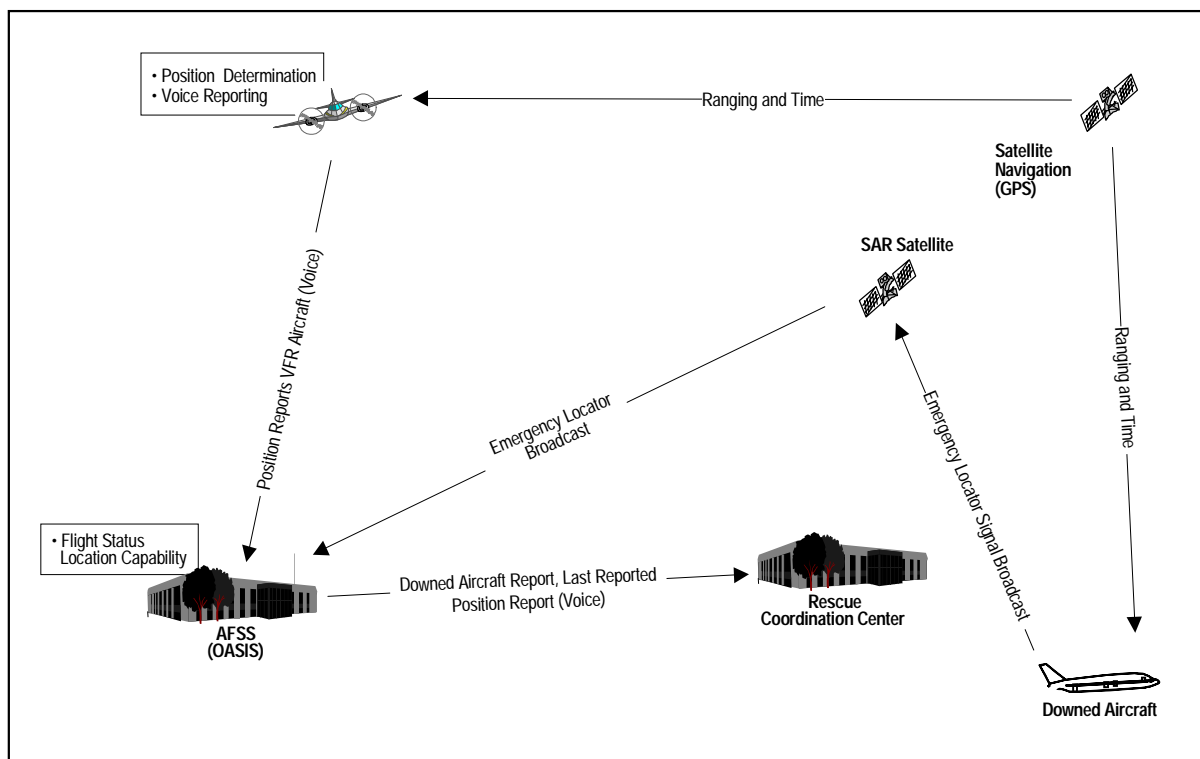


Figure D-45. Increased Ability To Support Search and Rescue Activities, NAS Management Services, NAS Information, Phase 3 (2008–2015)

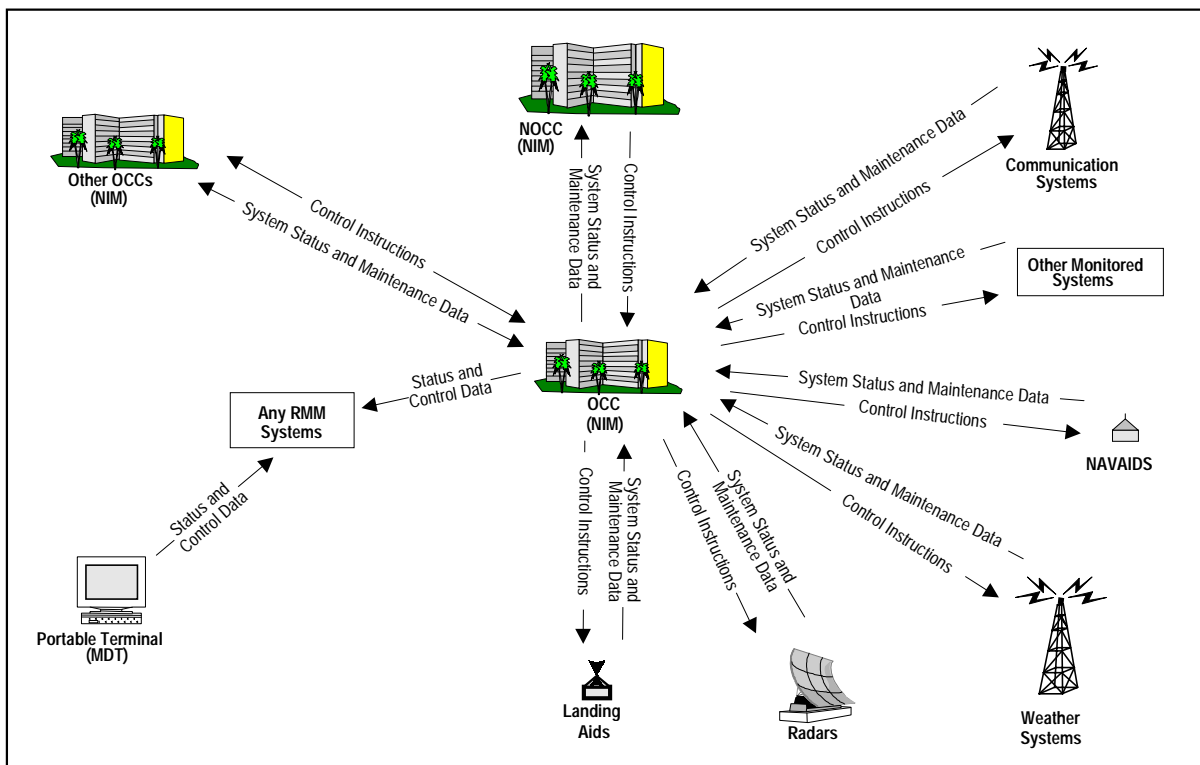


Figure D-46. Improved Infrastructure Maintenance Management, NAS Management Services, Infrastructure Management, Phase 1 (1998–2002)

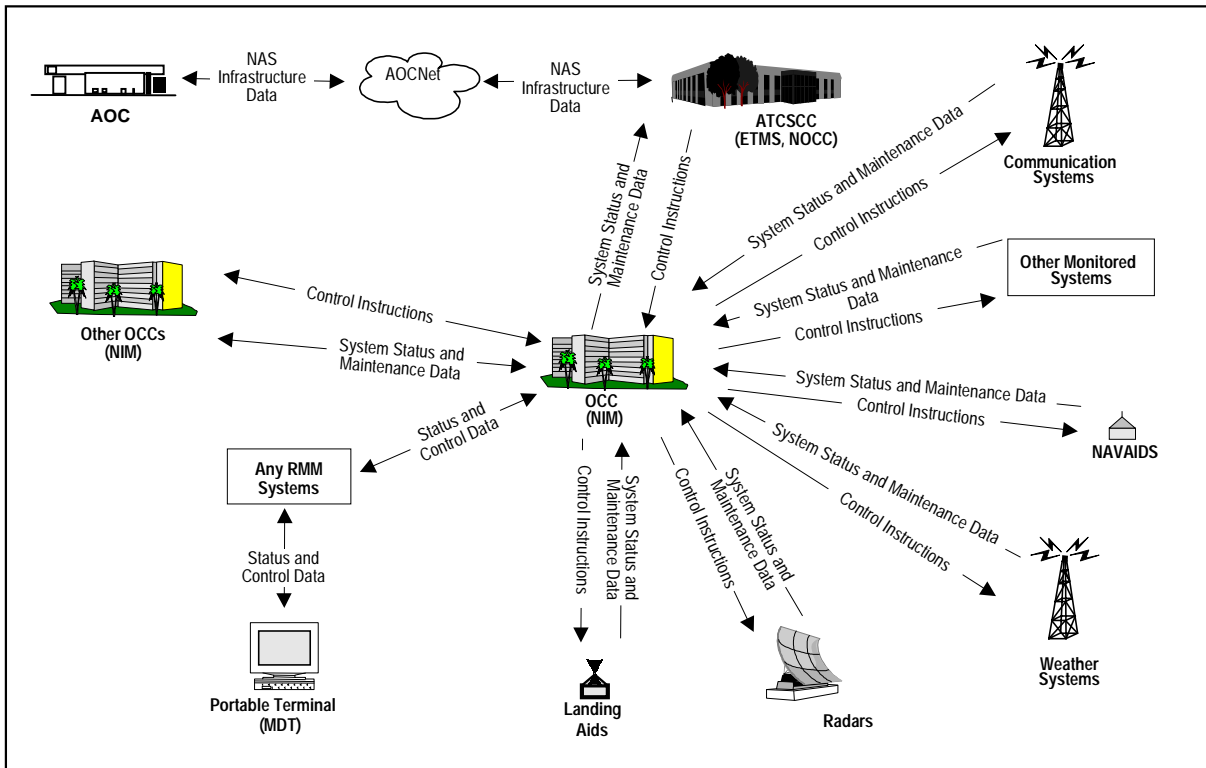


Figure D-47. Improved Infrastructure Maintenance Management, NAS Management Services, Infrastructure Management, Phase 2 (2003–2007)

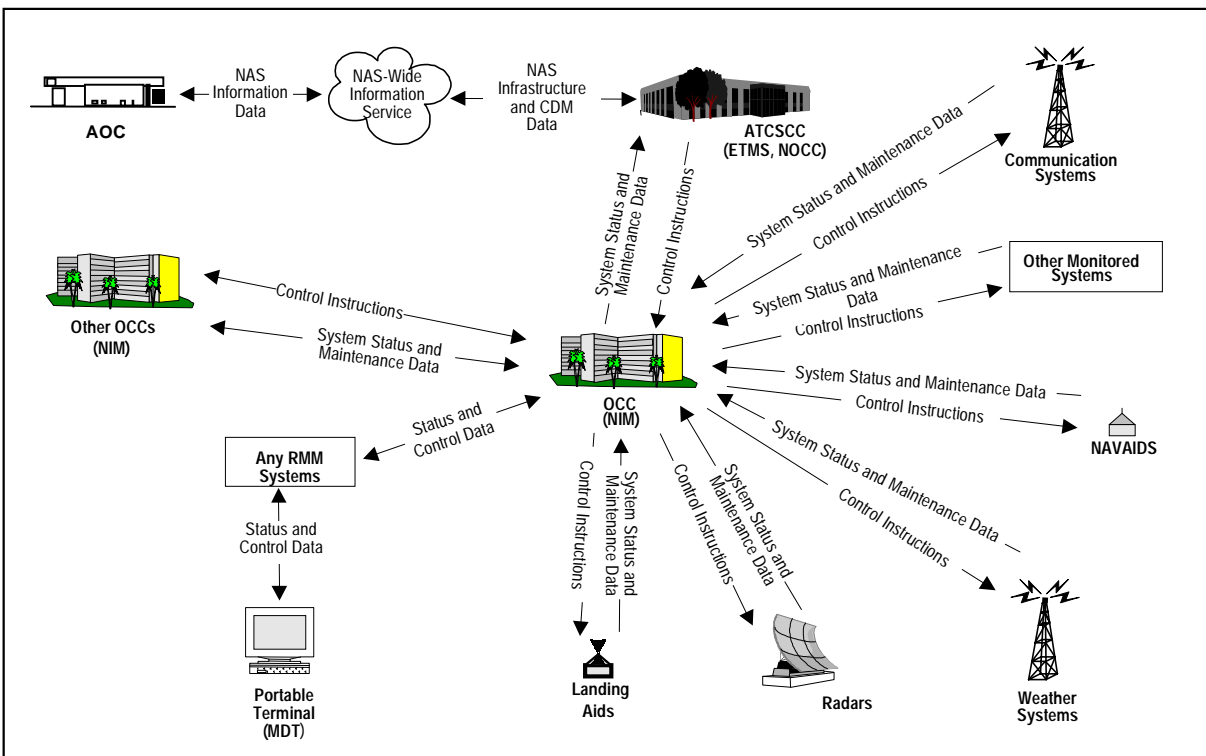


Figure D-48. Improved Infrastructure Maintenance Management, NAS Management Services, Infrastructure Management, Phase 3 (2008–2015)

- During and at completion of maintenance activity, the technician enters data into a maintenance data terminal (MDT) that forwards the information to the OCC for evaluation and storage.
- System status and selected performance parameters are periodically provided to the OCC. These parameters can also be read by the National Operations Control Center (NOCC) upon request.
- System status reports are sent from all OCCs to the NOCC for NAS impact evaluation and input to the traffic management operation.
- Selected systems accept configuration change instructions through the remote maintenance sensor (RMS) function (e.g., radar channel changes).

Phase 2 (2003–2007)

- As more NAS systems are monitored, the NAS facility status data become more accurate and available to users and service providers.

- CDM for maintenance activities allows for limited collaboration with users for scheduled maintenance activities.

Phase 3 (2008–2015)

- Improved CDM for maintenance activities allows for expanded collaboration with users for scheduling maintenance activities.

D.2 Capability Matrix

The capability matrix is divided into two parts. Part one addresses air traffic service capabilities throughout the active phase of flights. Part two addresses NAS management services that cross domains of flight or involve infrastructure management issues.

The matrix lists the 16 top-level capabilities identified in the NAS concept of operations (CONOPS). Each capability is addressed by phase of flight and phase of the modernization plan. The matrix columns contain functions needed to achieve the desired capability. The bold italic text is the commonly used name of the capability.

Table D-1. NAS Modernization Capabilities – Air Traffic Services

Capability	Tower/Airport Surface	Arrival/Departure	En Route/Cruise	Oceanic	NAS-Wide (Multiple Domains of Flight)
1. Increased Navigation/Landing Position Accuracy and Site Availability					
Phase 1.	No change in capability	Initial WAAS Precision Approach Existing Airports Provides WAAS precision approaches to airports that currently have existing Category I or other approaches; actual approach minima will continue to be based on obstacle clearance, lighting, etc. Initial WAAS Precision Approach New Qualifying Airports Provides WAAS precision approaches to airports that currently do not have precision approaches; actual approach minima will continue to be based on obstacle clearance, lighting, etc.	No change in capability	GPS Oceanic Provides pilots an additional, more precise and reliable means to determine aircraft position	Terrain Avoidance Provides GPS-based vertical reference; provides pilots with enhanced ground proximity warning Initial WAAS Cruise Provides area navigation capability
Phase 2.	No change in capability	LAAS CAT I Provides LAAS Category I precision approaches to airports not adequately covered by WAAS LAAS CAT II, III Provides LAAS Category II/III precision approaches to airports	No change in capability	No additional change in capability	No additional change in capability
Phase 3.	No change in capability	No additional change in capability	No change in capability	Transition to En Route/Cruise	No additional change in capability
2. Increased Exchange of Common Weather Data					
Phase 1.	Not applicable	ITWS Stand-Alone Consolidates terminal weather information onto a single stand-alone display available to the controller for windshear and other hazardous weather information Initial TWIP Provides in-flight graphical terminal weather information to pilots based on TDWR data relayed through a service provider; this service is primarily for commercial carriers Expanded TWIP Provides in-flight graphical terminal weather information to pilots during flight based on data relayed through a service provider; this service is primarily for commercial carriers	Weather on DSR Consolidates weather data onto the en route controller workstation, DSR; this enables selected LRR decommissioning Terminal Weather Exchange Provides a common weather data picture among the Traffic Management Specialist, terminal, and en route controllers	No change in capability	MDCRS Enables the collection of real-time airborne weather data from participating aircraft and then integrates this collected data with other NAS weather products Enhanced MDCRS Provides collection of real-time airborne weather data, including temperature and humidity, from participating aircraft, and integrates the data with other weather products for NAS-wide distribution Initial FIS Provides NWS weather information to the pilot through a service provider; this service is primarily for general aviation

Table D-1. NAS Modernization Capabilities – Air Traffic Services

Capability	Tower/Airport Surface	Arrival/Departure	En Route/Cruise	Oceanic	NAS-Wide (Multiple Domains of Flight)
Phase 2.	Not applicable	Improved Weather on STARS Consolidates terminal weather information onto a single integrated display available to the controller for windshear and other hazardous weather information	No additional change in capability	No change in capability	No additional change in capability
Phase 3.	Not applicable	Automatic Simultaneous Hazardous Weather Notification Provides real-time windshear alert information to pilots	No additional change in capability	Transition to En Route/Cruise	No additional change in capability
3. Improved Aircraft Positional Accuracy Reporting to Service Providers					
Phase 1.	ASDE with AMASS Alerts controllers to potential collision situations in the airport movement area at large airports; provides controllers with target identification to aid in the situational awareness ASDE Provides controllers with primary radar targets to aid in controlling surface traffic and for situational awareness	Improved Terminal Surveillance (ASTERIX/S) Improved aircraft position accuracy reporting to service providers	No change in capability	No change in capability	No change in capability
Phase 2.	Runway Incursion Reduction Alerts controllers to potential collision situations in the airport movement areas for qualifying airports that do not have ASDE/AMASS; improves airport markings, signage, and lighting; improves the training for pilots about runway signage, lights, and markings	Integrated Terminal Surveillance with ADS-B Provides controllers better position information about air traffic based on GPS; this is an intermediate step toward active FAST	Improved En Route Surveillance (ASTERIX/S) Improved aircraft position accuracy reporting to service providers Integrated En Route Surveillance with ADS-B Provides controllers better position information for air traffic based on GPS	No change in capability	No change in capability
Phase 3.	Integrated Tower Area Surveillance Provides controllers better position information about the air traffic based on GPS; also provides controllers integrated information about the arriving aircraft and airport surface aircraft	No additional change in capability	No additional change in capability	Transition to En Route/Cruise	No change in capability

Table D-1. NAS Modernization Capabilities – Air Traffic Services

Capability	Tower/Airport Surface	Arrival/Departure	En Route/Cruise	Oceanic	NAS-Wide (Multiple Domains of Flight)
4. Increased Self-Separation by Properly Equipped Aircraft					
Phase 1.	Not applicable	No change in capability	No change in capability	No change in capability	<i>Air-Air ADS-B</i> Provides pilots a cockpit display of traffic information of other properly equipped ADS-B aircraft <i>TIS via Mode-S</i> Provides air traffic surveillance information to properly equipped in-flight aircraft using Mode-S
Phase 2.	Not applicable	No change in capability	No change in capability	No change in capability	No additional change in capability
Phase 3.	Not applicable	No change in capability	No change in capability	<i>Transition to En Route/Cruise</i>	No additional change in capability
5. Increased Surveillance Area Coverage					
Phase 1.	Not applicable	No change in capability	No change in capability	No change in capability	No change in capability
Phase 2.	Not applicable	No change in capability	<i>Enhanced En Route Radar Coverage</i> Provides en route controllers with terminal radar data, thereby covering some areas where ARTCC radar service does not presently exist <i>ADS-B Gap-Filler</i> Provides controllers with expanded ability to offer separation services in remote areas that are currently not covered by radar, by providing the controllers the ability to receive aircraft position broadcasts	<i>Oceanic Surveillance via ADS-A</i> Provides controllers more timely and more accurate position information about oceanic aircraft	No change in capability
Phase 3.	Not applicable	No change in capability	No additional change in capability	<i>Transition to En Route/Cruise</i>	No change in capability
6. Increased Digital Voice and Data Communications Among Service Providers and Pilots					
Phase 1.	<i>TDLS</i> Provides predeparture clearance and ATIS via service provider data link at a limited set of airports.	No change in capability.	<i>CPDLC Build 1</i> Provides lead-in test period that allows controllers and pilots to directly exchange a limited set of data link non-time-critical messages in the en route environment <i>CPDLC Build 1A</i> Provides for national deployment of a limited set (18) of non-time-critical data link messages	<i>Oceanic Data Link</i> Provides controllers and pilots in an initial single sector environment to exchange digital data messages for control purposes in oceanic airspace <i>Multisector Oceanic Data Link</i> Provides controllers and pilots the ability to exchange digital data messages throughout the oceanic airspace	No change in capability.

Table D-1. NAS Modernization Capabilities – Air Traffic Services

Capability	Tower/Airport Surface	Arrival/Departure	En Route/Cruise	Oceanic	NAS-Wide (Multiple Domains of Flight)
Phase 2.	Expanded TDLS Provides pilots with predeparture clearance and ATIS via service provider data link at an expanded number of airports; allows specific set of data transmission from tower controller to aircraft	No change in capability	CPDLC Build 2 via VDL-Mode-2 Allows ATC and pilots to directly exchange digital messages in non-time-critical situations in the en route environment	No additional change in capability	No change in capability
Phase 3.	No additional change in capability	No change in capability	CPDLC Build 2 via VDL-Mode-3 Increased digital voice and data communications between service providers and pilot	Transition to En Route/Cruise	CPDLC Build 3 via VDL-Mode-3 Increased digital voice and data communications between service providers and pilot NAS-Wide Data Link Allows controllers and pilots to directly exchange digital messages, such as FIS and TIS information throughout the NAS
7. Improved Flight Plan Negotiation					
Phase 1.	No change in capability	No change in capability	No change in capability	No change in capability	No change in capability
Phase 2.	No change in capability	No change in capability	No change in capability	No change in capability	No change in capability
Phase 3.	No change in capability	No change in capability	No change in capability	Transition to En Route/Cruise	Interactive Airborne Refile Provides in-flight, electronic exchange and automated processing of flight plan change requests between pilots and controllers for entire route clearance
8. Improved Arrival and Departure Sequencing and Spacing for Tactical Traffic Flow					
Phase 1.	Not applicable	pFAST (FFP1) Provides terminal controllers new tools to allow better sequencing and runway assignment of aircraft on final approach to congested airports	Single Center Metering (FFP1) Provides the en route controllers and traffic managers with arrival scheduling tools to optimize traffic flow from a single center to a high-activity airport within that center's airspace	Not applicable	No change in capability
Phase 2.	Not applicable	No additional change in capability	Multicenter Metering with Descent Advisor Provides the en route controllers and traffic managers with arrival scheduling tools to optimize traffic flow from multiple centers to a high activity airport near a center's boundary	Not applicable	No change in capability

Table D-1. NAS Modernization Capabilities – Air Traffic Services

Capability	Tower/Airport Surface	Arrival/Departure	En Route/Cruise	Oceanic	NAS-Wide (Multiple Domains of Flight)
Phase 3.	Not applicable	<i>aFAST with Wake Vortex</i> Provides new tools to the controller to allow better sequencing, spacing, and runway assignment of aircraft on final approach to congested airports; includes refined considerations for wake vortex and specific aircraft characteristic algorithms	No additional change in capability	Not applicable	No change in capability
9. Increased Flexibility in Flying User-Preferred Routes					
Phase 1.	Not applicable	Not applicable	<i>URET CCLD (FFP1)</i> Allows D-side controllers to better manage en route traffic with an increased awareness of potential conflict situations; additionally, allows controllers to grant user requests through the use of a trial planning capability; the capability is limited to selected centers and sectors within those centers	No change in capability	No change in capability
Phase 2.	Not applicable	Not applicable	<i>Conflict Probe</i> Allows D-side controllers to better manage en route traffic with an awareness of potential conflict situations; additionally, allows controllers to grant user requests through the use of a trial planning capability; this capability allows additional sites beyond URET CCLD	No additional change in capability	No change in capability
Phase 3.	Not applicable	Not applicable	<i>Conflict Resolution with Multicenter Metering</i> Provides controllers flight plan recommendations as consideration for providing optimum separation services to solve potential conflicts	<i>Transition to En Route/Cruise</i>	No change in capability
10. Increased Airspace Capacity					
Phase 1.	Not applicable	Not applicable	No change in capability	<i>RVSM/50 Lateral</i> Enables the controller and the pilot to negotiate passing maneuvers within the oceanic domain	Not applicable
Phase 2.	Not applicable	Not applicable	No change in capability	<i>50/50</i> Provides tools to the controller to enable reduced separation standards to be utilized for properly equipped aircraft	Not applicable
Phase 3.	Not applicable	Not applicable	No change in capability	<i>Transition to En Route/Cruise</i>	Not applicable

Table D-1. NAS Modernization Capabilities – Air Traffic Services

Capability	Tower/Airport Surface	Arrival/Departure	En Route/Cruise	Oceanic	NAS-Wide (Multiple Domains of Flight)
11. Improved Surface Traffic Management					
Phase 1.	Atlanta SMA A prototype decision aid for controllers that provides recommended taxi routes for arriving and departing aircraft to optimize surface movement Initial SMA (FFP1) Provides airport ramp and control operators with a one-way feed of current traffic information not previously available; this availability is at selected airports for participating airlines	Not applicable	Not applicable	Not applicable	Not applicable
Phase 2.	SMA Provides additional tools that provide controllers with recommended taxi routes for arriving and departing aircraft for optimizing surface movement SMS Provides airport configuration, aircraft arrival/departure status, and airfield ground movement advisories to controllers, dispatchers, and traffic flow managers; it will interface with AMASS and the terminal automation to help controllers coordinate arrival/departure flows with surface movements	Not applicable	Not applicable	Not applicable	Not applicable
Phase 3.	Enhanced SMS Provides additional tools for the exchange of terminal and airport surface data between ATC and AOCs in a manner that supports the efficient movement of aircraft on the airport surface; it will enable users and providers to have access to flight planning, traffic management, arrival/departure, and weather information	Not applicable	Not applicable	Not applicable	Not applicable
12. Increased Low-Altitude Direct Routes					
Phase 1.	Not applicable	Not applicable	No change in capability	Not applicable	Low-Altitude Direct Routes Using WAAS Provides low-altitude direct routes to be flown by WAAS-equipped aircraft

Table D-1. NAS Modernization Capabilities – Air Traffic Services

Capability	Tower/Airport Surface	Arrival/Departure	En Route/Cruise	Oceanic	NAS-Wide (Multiple Domains of Flight)
Phase 2.	Not applicable	Not applicable	No change in capability	Not applicable	<p><i>Low-Altitude Direct Routes, Expanded Radar Coverage</i> Provides additional low-altitude direct routes in areas that are currently served by radar by integrating revised airspace design and air-ground communications</p> <p><i>Low-Altitude Direct Routes, Expanded Surveillance Coverage</i> Provides integrated and expanded surveillance coverage for additional low-altitude direct routes for properly equipped aircraft in nonradar areas</p>
Phase 3.	Not applicable	Not applicable	No change in capability	Not applicable	No additional change in capability
13. Increased Availability of Aeronautical Information to Service Providers and NAS Users					
Phase 1.	No change in capability	No change in capability	No change in capability	No change in capability	No change in capability
Phase 2.	No change in capability	No change in capability	No change in capability	No change in capability	No change in capability
Phase 3.	<i>Transition to NAS-Wide</i>	<i>Transition to NAS-Wide</i>	<i>Transition to NAS-Wide</i>	<i>Transition to NAS-Wide</i>	<p><i>NAS-Wide Information Sharing</i> Provides for the timely and accurate dissemination of NAS information among the aviation community, including international sharing of appropriate flight planning information</p>

Table D-2. NAS Modernization Capabilities – NAS Management Services

Capability	Traffic Management	NAS Information	Infrastructure Management
14. Improved CDM Between Service Providers and NAS Users for Strategic Planning			
Phase 1.	AOCNET An existing information exchange among participating AOCs and the FAA to facilitate traffic management Initial CDM Provides participating AOCs and the FAA with real-time access to current NAS status information, including infrastructure and operational factors	Not applicable	Not applicable
Phase 2.	Flight Plan Evaluation Provides interactive feedback to NAS users proposed flight plans based on current constraints such as special use airspace and equipment status	Not applicable	Not applicable
Phase 3.	Full CDM Provides more robust interactive feedback to NAS users proposed flight plans based on current constraints such as special use airspace, equipment and facility status, and weather conditions	Not applicable	Not applicable
15. Increased Ability To Support Search and Rescue Activities			
Phase 1.	Not Applicable	No change in capability	Not applicable
Phase 2.	Not Applicable	No change in capability	Not applicable
Phase 3.	Not Applicable	ELT for SAR and Flight Following Provides GPS location information and discrete aircraft identification of downed aircraft through satellite-based communications	Not applicable
16. Improved Infrastructure Maintenance Management			
Phase 1.	Not Applicable	Not Applicable	Increased RMM Provides improved and more consolidated remote monitoring for NAS facilities
Phase 2.	Not Applicable	Not Applicable	CDM for Maintenance Activity Allows for limited collaboration with users for scheduled maintenance activities
Phase 3.	Not Applicable	Not Applicable	Improved CDM for Maintenance Activities Allows for expanded collaboration with users for scheduling maintenance activities

